Kenneal
Harris (P.)

ISIS

International Review devoted to the History :: of Science and Civilization ::
Quarterly Organ of the History of Science Society and of the International Academy of the History of Science.

SUMMARY

of No. 76 (Vol. XXVIII, 1)

316 p., 1 pl., 19 figs.

Published in February 1938

Main articles (7)

G. SARTON *(Cambridge, Mass.)*.—An Institute for the History of Science and Civilization *(3rd article)* 7
C. F. MULLETT *(Columbia, Mo.)*.—Sir WILLIAM PETTY on the plague 18
H. HARRIS *(San Francisco)*.—Manchester's board of health in 1796 26
R. E. SCHLUETER *(St. Louis, Mo.)*.—FREDERICK ADOLPHUS WISLIZENUS (1810-1889), pioneer meteorologist, physician and natural scientist (8 figs.) 38
L. THORNDIKE *(New York City)*.—CHARLES HOMER HASKINS (1870-1937) (portr.) 53
F. S. HAMMETT *(Philadelphia)*.—The ideas of the ancient Hindus concerning man 57
T. L. DAVIS *(Cambridge, Mass.)*.—Pictorial representations of alchemical theory (9 figs.) 73

Carnegie Institution of Washington. Division of historical research. Section of the history of science (19th Annual Report) . . 87

Notes and Correspondence (11)

Answer to Query 62.—JOHANNES GAZULUS (V. ZOUBOV) 92
Answer 2 to Query 63.—Early editions of the *Deutsche Sphaera* of CONRAD OF MEGENBERG (V. ZOUBOV) 92
Question no. 72.—Les sources de LÉON BATISTA ALBERTI dans son traité *De re aedificatoria* (V. ZOUBOV) 93
Neuvième centenaire d'IBN SINA (Ş. GÜNALTAY and S. ÜNVER).—A facet from the life of NEWTON (G. MCCOLLEY).—JEAN STAS (G. S.) 94
Harvard University. Seminary of the history of science and learning, 2nd year.—The Unity History Schools.—The American Documentation Institute.—San Francisco. Division of Medical History of the University of California Medical School 95
Editorial board of *Isis* 100

Reviews (26)

XVth Century. HOLCOMB, R. C.—Who gave the world syphilis? The Haitian myth. New York, Froben Press, 1937 (M. F. ASHLEY-MONTAGU) 101
XVIIth Century. FABRY, W. v. HILDEN.—Von der Fürtrefflichkeit und Nutz der Anatomie. Ed. by F. DE QUERVAIN and H. BLOESCH. Leipzig, SAUERLÄNDER, 1936 (M. F. A.-M.) 102
PAGEL, W.—Religious motives in the medical biology of the XVIIth Century. Baltimore, 1935 (J. NEEDHAM) 103
XVIIIth Century. DAVID GREGORY, ISAAC NEWTON and their circle. Extracts from D. G. memoranda. Ed. by W. G. HISCOCK. Oxford, 1937 (J. PELSENEER) 105
MENSHUTKIN, B. N.—The works of M. V. LOMONOSOV on physics and chemistry. Moscow, 1936 (A. P.) 106

	SHOEMAKER, E. C.—N. WEBSTER, pioneer of learning. New York, Columbia University Press, 1936 (R. ULICH)	110
	TORLAIS, J.—RÉAUMUR. Paris, DESCLÉE, 1936 (G. S.) (2 figs)	112
	MACKANESS, G.—Sir JOSEPH BANKS. Sydney, ANGUS and ROBERTSON, 1936 (C. A. KOFOID)	116
XIXth Century.	PENNELL, F. W. — Travels and scientific collections of THOMAS NUTTALL. Philadelphia, 1936 (C. A. K.)	116
	RAMÓN Y CAJAL, S.—Recollections of my life; translated by E. H. CRAIGIE and J. CANO. Philadelphia, 1937 (G. S.)	118
	FROST, W. H.—SNOW on cholera. New York, 1936 (C. A. K.)	122
Antiquity.	DIEPGEN, P.—Die Frauenheilkunde der alten Welt. München, BERGMANN, 1937 (A. DILLER)	123
Egypt.	The Papyrus Ebers. Transl. by B. EBBELL. Copenhagen, LEVIN and MUNSKGAARD, 1937 (O. TEMKIN)	126
Middle Ages.	DOBIASH-ROZHDESTVENSKAYA, N. A., BURSKI, M. I. and others.—Agriculture in Western mediaeval records. Moscow, 1936 (A. P.)	131
History of Science.	GUNTHER, R. T.—Early science in Cambridge. Oxford University Press, 1937 (M. F. A.-M.)	134
	III^{e} Congrès international d'histoire des sciences, Lisboa, 1936 (G. S.)	135
Mathematics.	HOGBEN, L.—Mathematics for the million. New York, NORTON, 1937 (M. F. A.-M.; H. T. DAVIS)	138
Astronomy.	VAN WIJK, W. E.—Le nombre d'or. The Hague, NIJHOFF, 1936 (A. POGO)	140
	De Gregoriaansche kalender. Maastricht, 1932 (A. POGO)	140
Geography.	L'œuvre scientifique du Club Alpin Français. Paris, 1936 (D. B. DURAND)	143
	KAMAL, Y.—Hallucinations scientifiques (Les portulans). Leiden, BRILL, 1937 (D. B. D.)	144
Zoology.	PARKER, G. H.—Color changes of animals in relation to nervous activity. University of Pennsylvania Press, 1936 (C. A. K.)	146
Botany.	SCHAFER, J.—The social history of American	

agriculture. New York, MACMILLAN, 1936 (C. A. K) 149

Ethnology. HUXLEY, J.—Africa view. London, CHATTO, 1936 (G. S.) 150

Philosophy. Factors determining human behaviour. Harvard University Press, 1937 (R. K. MERTON) . . 151

Authority and the individual. Harvard University Press, 1937 (R. K. M.) 151

Fifty-first Critical Bibliography of the History and Philosophy of Science and of the History of Civilization (to end of July 1937; 945 items contributed by 14 scholars) 154

An Institute for the History of Science and Civilization

(Third article)

The article which follows, beginning with the paragraph entitled "Preamble," was issued in a very small mimeographed edition on Saturday, December 5, 1936. On that same day illness or rather protracted tiredness obliged me to sail on the good Canadian ship Lady Drake for a cruise to the Lesser Antilles and British Guiana.

Upon my return to Cambridge on January 4, I found waiting for me on my desk a budget of letters, wherein some of my correspondents acknowledged receipt of my article and expressed their interest in it. I am grateful to them, especially to Professor ASHLEY-MONTAGU of New York University, President CONANT of Harvard, Dr. HARVEY CUSHING, Professor ROBERT A. MILLIKAN, Dr. A. POGO, Professor C. D. LEAKE, Dr. ALEXIS CARREL, Dr. CHARLES SINGER, Professor JOHAN NORDSTRÖM of Upsala, Professor FREDRIK STANG of Oslo and Professor HENRY E. SIGERIST of Johns Hopkins. Professor MILLIKAN's letter included constructive criticism which I answered in a letter reproduced below in the Appendix.

In spite of so much kindness my third appeal was as unsuccessful as the two previous ones. However, this did not and will not abate my enthusiasm in the least. When I was a young student I chose for my motto the proud motto of WILLIAM THE SILENT "Je n'ai pas besoin d'espérer pour entreprendre ni de réussir pour persévérer." To be sure I would prefer to be successful, but I will not allow material failure to discourage me. It satisfies me to think that if my ideas are right they will surely bring their own good fruits in the fullness of time; a little delay does not greatly matter. And if they be not right, their unsuccess is a good fortune. Needless to say I myself believe that these ideas are right and sound, and I will continue to fight for them until the end of my life, irrespective of success or failure.

Apropos of this I must add that the situation is somewhat paradoxical, for as a person I have been more successful than I deserved. The Carnegie Institution and Harvard University are treating me with great generosity and all kinds of honors have been showered upon me. I have nothing to ask for myself and am thus singularly independent. Personally I have been as successful as anybody as imperfect as I am could hope to be; but my impersonal projects have met with nothing but failure.

The teaching of the history of science is still very badly organized. College presidents are often expressing deep interest in the subject but how often do they enable competent scholars to devote themselves *completely* to it? Hardly ever.

The result is that the teaching is still very largely in the hands of dilettanti, who may be distinguished men in other scientific fields, but do *not* know the

history of science, and do not even know enough of it to realize their ignorance.

The same scientists who would take infinite pains to make scientific observations or experiments and to describe them correctly, will treat historical facts with the utmost nonchalance. They seem to feel that an insect should be dissected with extreme precision, but that when it comes to characterize a great man of science and his activities anything will do. What is the worst of all they do not hesitate to use the authority legitimately obtained in other investigations, in order to lend countenance to historical conclusions most of which are worthless (1). Thus the history of science is not only prevented from progressing, it is made to regress. Old errors are continually given new currency because distinguished scientists often combine a strange "cacoëthes scribendi" in historical matters with a complete lack of historicalintegrity.

The poor state of our studies to-day is similar to that which would obtain, say, in astronomical research, if there were no impersonal observatories, where astronomical facts are collected, registered, analyzed, classified and transmitted, and if our knowledge depended only on the sporadic efforts of individual amateurs, some of them good or even very good, most of them indifferent.

The essence of the project outlined below is to provide for our studies a center of research of sufficient solidity, durability and prestige, to create standards comparable to those obtaining in other scientific and historical fields, to establish and maintain traditions of scholarship, and to replace our Sisyphean and Danaïdean efforts by *continuous* and *permanent* ones.

I believe that the purest and noblest traditions of mankind deserve to be analyzed and recorded with as much care and precision as is now devoted to, let us say, the spectra of stars or the varieties of seaweeds. In every case, in order to obtain as much of the truth as is within our reach, in order to keep and diffuse whatever amount of truth has been obtained, and finally in order to prevent it from being lost or corrupted by uncritical writers, there must be some kind of a central institute or clearing house—a means of *continuity* and *permanence*. The work done in such an institute would be slow and most of it inconspicuous, even as most of the work which is done in an observatory. That work would be slow and thus relatively expensive, but *continuous* and *permanent*.

Cambridge, Massachusetts. GEORGE SARTON.
May 29, 1937.

Preamble.—The two previous articles bearing the same title appeared twenty years ago in *Science* (vol. 45, 284-88, vol. 46, 399-402, 1917). The present one is now published in a small mimeographed edition for private distribution. A corrected edition of it will eventually appear in *Isis* or in *Osiris*.

Though the appeal of 1917 was endorsed by ninety leading American scientists and scholars, the plans outlined in it have not materialized. I have been stimulated into reviving them

(1) They may be worthless even if correct, because there is no means of knowing how they have been reached.

by the following circumstances. The apparatus criticus which I have collected for 25 years (the richest of its kind in the world) is becoming unwieldy. When used by many persons, as it is now, it cannot be kept in good order without the assistance of a responsible librarian. The space allotted to it in the Widener library is almost completely used up. Unless assistanceis received, my efforts will be stifled by their own growth. A little help will not help; the basis of the undertaking must be changed.

Being thus driven to the wall by the very success of my own efforts, I am led to reconsider my earlier plans. Their realization might provide a way out. I have no personal ambition in the matter. The Institute must be founded, and it will be founded somewhere sooner or later. I would prefer it to be founded in Harvard than anywhere else, and would accept the leadership of it, but that is not my main object. My first loyalty is to the History of Science, not to the Carnegie Institution, nor to Harvard, nor to self. If such an Institute as I have in mind were well equipped and managed, I would like nothing better than to be allowed to work unobtrusively in its quietest corner.

There has been much talk in recent years of the need of humanizing science, but nothing has been done on a sufficient scale to satisfy that need. Large endowments are found for the creation of new laboratories and observatories, but the relatively small endowment needed for historical and humanistic purposes is apparently unavailable. There is plenty of money for instruments of increasing cost, but no money is available to make sure that the men using these instruments will remain sufficiently educated. Putting it bluntly, a certain percentage (say 5 %) of the scientific budget should be devoted to the humanization of science as an insurance against its gradual barbarization. Scientific studies and teaching are so lopsided on the purely technical side that a healthy balance cannot be restored by pious exhortations and halfhearted measures.

Secular continuity.—The most disheartening feature of historical work to-day is the frequent replacement of older books by newer ones which are less good and give a new currency to old errors. This is due to the inexperience of many historians of science, to the historical dilettantism of distinguished scientists, above all to the lack of standards.

The best way to cure these evils is slowly to produce accounts of the history of science as comprehensive and accurate as possible, and sufficiently massive to justify the publication of periodical errata and addenda, and from time to time of new editions incorporating the accumulated improvements. My *Introduction* and *Isis* are good but insufficient beginnings in that direction. I cannot do more, though I am desperately straining all my energy and every resource in the effort, because I am not sufficiently supported.

Indeed such accurate and systematic work is slow, tedious, difficult and austere; also expensive, though in the long run it is far more economical than fast and inaccurate work, which is unreliable and ephemeral.

The establishment of the history of science as I understand it, is a *secular* undertaking; it cannot be realized except by the coöperation of successive generations of disciplined scholars working together quietly, humbly, without undue haste but without cease. To illustrate, consider two other secular undertakings. The Jesuits, HERIBERT ROSWEYDE (d. 1629) and JOHN BOLLAND (d. 1665), organized the study of hagiology. The first volume of the *Acta sanctorum* appeared in 1643; the work has been continued ever since by a devoted band of scholars called Bollandists; it is not yet completed. At the beginning of the eighteenth century, Dom ANTOINE RIVET DE LA GRANGE and other Benedictines of the Congregation of St. Maur undertook to write the history of French literature on a scientific basis. The first volume appeared in 1733; in 1807 the work was continued by the Académie des inscriptions; they have now reached the fourteenth century.

The work I have undertaken, the writing of the history of science and learning, the history of the development of objective knowledge of every kind in every country at every time, is much broader in scope than either of these two examples. Its completion will be far more difficult, and will involve the coöperation of many generations of scholars. Our main task is to train the first group of scholars and to establish sound traditions.

Need of an Institute.—It is because this project is *secular* that an *Institute* is needed. As it is beyond the grasp of a single scholar, or of a single generation, its organization must be intrusted

to a body of scholars, in order that the work may be continued and indefinitely perfected. I hope that at the time of its Fourth Centenary Harvard University may find within its orbit an Institute of the History of Science and Learning in full swing, continuing its immense task with extreme care and reasonable speed. By that time it may already have produced a few standard works, and thus raised the level of historiography throughout the world.

The Institute would consist of a staff of experts using the apparatus criticus bequeathed to them by earlier colleagues and gradually enriched by themselves, and following definite traditions of scholarship subject to continuous selection and improvement. The men come first to be sure, but the best men cannot do their best without a very elaborate equipment, the preparation of which implies the uninterrupted devotion of many generations. Succeeding scholars do not gradually improve—the earlier ones may be better than their successors—but their equipment becomes better and richer and their traditions more exacting.

Strangely enough while there are many similar institutes devoted to the history of art, or religion, or of other phases of culture, there is none really well equipped devoted to the history of science (2). There is no need of many such institutes, but there should be at least one, established preferably in or near one of the largest libraries, within the orbit of a great university.

Science and learning.—Since the beginning of my efforts in 1912, my conception of science has been continually broadening. It now includes the whole of objective and verifiable knowledge (3). However, much of that knowledge is often classified under the heading of "learning" rather than that of "science," and "learned societies" are often opposed to "scientific societies" though their aim is essentially the same, to determine the most probable truth in their respective fields. President CONANT's suggestion to speak of "science and learning" instead of science alone is thus very welcome; it helps to bring together scholars and scientists by making them realize their kinship. The history

(2) Certainly not in America. The word Institute is loosely used by many universities to represent something which does not include the two essential elements of secular continuity : full-time staff, accumulating archives.

(3) *Introduction* (vol. 1, 3, 1927).

of science is enriched in many ways if it is made to include the history of learning.

East and West.—Many scientists conceive the history of science only from their own western point of view, and do not realize how much of it is of eastern origin. That conception is not only incomplete but false. Western and eastern influences are complementary, and one cannot neglect the one or the other without loss of perspective. The antithesis East and West is somewhat comparable to the one considered in the previous section. Failure to take both sides into account (East *and* West, science *and* learning) implies the same intellectual distortions and shortcomings in either case.

Contemporary science.—Even as the smallest institute should devote a part of its activities to the history of learning and to eastern thought lest it be unbalanced, even so provision should be made from the beginning for the study of contemporary science as well as of the earlier achievements. Contemporary science may be understood in general as nineteenth and twentieth century science; or more strictly as beginning in the nineties of the last century. Historians of science must be trained to interpret the present in terms of the past and vice-versa. However, the study of contemporary science implies the use of methods of a very different kind, the emphasis being necessarily laid on the selection of the most significant materials, rather than a study of all the materials,—which would defeat its own purpose. Means must be taken to analyze gradually the scientific production of our time, and to prepare careful annals, without which the synthesis of later historians will hardly be possible. In a sense this task is more urgent than the others; it makes not much difference whether an exhaustive survey of fourteenth century science is available in 1930 or 1950, but the philosophically and historically-minded scientist of today should be able to review as easily as possible the efforts of his older contemporaries and to see them in their proper perspective. I shall explain methods to attain that purpose in my address as Chairman of Section L at the Atlantic City meeting of the AAAS in December (4).

(4) Illness prevented me from attending the Atlantic City meeting and delivering my address, but the substance of it appeared in *Isis*, " Remarks concerning the history of twentieth century science " (vol. 26, 53-62, 1936).

Ethical trends.—The members of the Institute would not be simply annalists and historians, but humanists. One of their main functions would be to interpret the ethical and social implications of science in all ages, and especially in our own, to integrate science into general education, in a word to "humanize" science. This has been understood best by historians of medicine, and no wonder, medicine being more intimately concerned than any other science with every aspect of individual and social life. Thus in some universities students are taught in the same courses the history of medicine, medical deontology and even social medicine.

It has been claimed that science is not concerned with moral issues. That may be true, yet scientists are members of the community and their aloofness is seldom excusable.

Some historians of science should be as well acquainted as possible with the history of religions, of ethics, and of social endeavors of every kind. It would be their special duty to harmonize the results of their inquiries with those concerning the history of science, and to help explain the ones in terms of the others.

Unification of good will.—An Institute devoted, as this one, to the study of the most precious common good of mankind might be considered a clearing house of good will, irrespective of its origin. Its highest function would be to interpret, primarily but not exclusively in scientific terms, the development of culture; not the culture of any nation, race, faith or profession but the culture of mankind. Indeed the ideals of humanity transcend immeasurably those of any group.

Defense of the scientific spirit and method.—One of these universal ideals is the love of truth, and the disinterested search for it, irrespective of desires and consequences. The history of science is to a large extent a history of the liberation of thought, of the conflict between rationalism and superstition (not religion), of man's quest for truth and gradual approach to it, of his struggle against error and unreason.

Iconography.—A department should be devoted to the collection of iconographical documents (e.g., portraits, medals) pertinent to the general purpose. This field of study would connect the Institute with art museums; in addition to the realization of

a practical aim it would introduce a new point of view and a new form of humanism.

Physical organization.—Details of organization need not be examined before the value of the Institute is understood and its general principles accepted, but a few generalities may help to complete this outline.

The ideal location of the Institute would be inside a large library, the largest available. Indeed the historian of science may be called upon to consult almost every kind of book or periodical, not only scientific but many others as well. However, such a location may be impossible to obtain or to retain, for an Institute growing within a Library would easily conflict with the latter. The next best location would be in a modest but extensible building, close to a very large library.

The building should be large enough to accommodate a reference library, the apparatus criticus (pamphlets, MSS, portraits, etc.), offices for members, reading rooms for students and visitors, a seminar room and perhaps a lecture room. It should be as beautiful as possible, which does not mean luxurious or expensive. Though open to every bona fide student, it should not be a show place. The best comparison perhaps is with an observatory, where astronomical data are patiently accumulated for immediate and secular use. In this Institute historical data would be collected, classified and interpreted, historical methods improved, humanistic traditions guarded, enriched and transmitted.

Staff.—The staff would include the director, librarian and archivist, and scholars of three grades, senior fellows, junior fellows and apprentices. In the selection of fellows and students one would have to take into account on the one hand the diverse needs of the Institute (e.g., science vs. learning, East vs. West, contemporary vs. ancient science) and on the other hand, the men available. Some fundamental needs (e.g., the care of the library and archives) should be satisfied at once, while the other departments would be allowed to grow according to the opportunities.

Cambridge, Mass. GEORGE SARTON.
Harvard Library, 185
Nov. 24, 1936.

APPENDIX

Among the letters received in answer to my communication of Dec. 5, 1936, the most instructive was written by Prof. R. A. MILLIKAN who is deeply interested in organizing the teaching of the History of science on as sound a basis as possible in the California Institute of Technology of Pasadena.

In his kind letter of January 14, 1937, he remarks :

" I hope that we may have the opportunity of discussing this whole field with you in some detail before very long. I am not at all certain that more progress can be made by developing an " Institute for the History of Science and Civilization " than by stimulating work in a dozen or so of universities already in existence. I have had to think through this problem pretty carefully with respect to my own field, physics, and about twenty years ago reached a decision definitely adverse to the establishment of a *detached research institute* of physics and chemistry. I reached the conclusion that with a given amount of funds available three or four times as much result could be obtained by working through a group of institutions scattered over the United States as by trying to concentrate the work into a detached research institute.

" Some time I should be glad to tell you this whole story, which represents a great deal of thinking, not only on my part but on the part of quite a group of men whom I called in to discuss this very question—some eighteen of them—twenty years ago. I am not at all sure that our conclusions would apply to the field of the history of science, but they might possibly have some bearing."

A part of my answer dated January 27, may now be quoted :

" I am grateful to you for your letter of Jan. 14, and your kind consideration of my project not only by yourself, but also in conferences with Professor GAY and Professor WATSON.

" Your objections refer to the *desirability* of the Institute and to the *possibility* of establishing it. Let me take these two points in turn.

" Your comparison with an institute of physics rests on a misunderstanding which I am very glad to discuss, as it is one of our main obstacles.

" In the case of the institute of physics, you decided that better results would be obtained by working through a group of institutions scattered over the United States, than by trying to concentrate the work into a detached research institute. This was undoubtedly a good decision, the wisdom of which has been borne out by the abundant fruits partly due to *emulation* between the physics departments of the main American universities. But what did that decision mean ? Simply this, that a number of small institutions (I am using your own word) was preferable to one very large one. I would be glad to accept a similar decision for my field of studies.

" The case of the history of science is very different : there are plenty of lectures but no " laboratories." The essence of my claim is that there should be at least one place where the history of science would be not simply taught, but studied

as thoroughly as possible, from bedrock, and where traditions of historical study would be developed in the same way that experimental methods are developed in laboratories and *cannot be developed otherwise*.

" To reverse the argument. What would the state of American physics be to-day, if instead of a central institute there had been created, not a number of local institutes, but simply chairs and lectureships and perhaps demonstration laboratories but no research laboratories? On that basis degeneration would be expected instead of progress.

" The main difficulty which I have to overcome is this one; the best work in the field of the history of science requires a deep and sound scientific training, yet scientists as a whole have no knowledge of historical methods nor appreciation of historical difficulties. The best (if not the only) way of explaining these methods is by means of a kind of historical laboratory, even as experimental methods cannot be easily explained, and cannot develop at all, except in a scientific laboratory.

" Such institutes and laboratories have been created in many countries for the study of national history, but we need one for the study of the history of science, which is essentially international, and human in the broadest acception, — the study of mankind at its best.

" To illustrate in another way the confusion between teaching (or diffusion) and research (or creation)—confusion which does not exist in the purely scientific field, but has not yet been eradicated from the historical one, allow me to tell you the following anecdote.

" One of my old students seeing me in Cambridge came to me and said: ' Having heard of your *Introductior to the history of science*, I hastened to buy it, hoping to find in it some reflection of your lectures. Believe me, Sir, I have never been more disappointed in my life. Your lectures were warm and stimulating, while your book was cold and dull...' I was thankful to him for his candour, and tried to explain the matter to him but I am not sure I succeeded.

" The teacher cannot do more than state a few simple facts or ideas as clearly as possible and give a general impression of the subject. Fine points of method can only be explained in the seminar or the workshop. If the teacher tried to hedge his every statement with all the qualifications which truth requires, he would become insufferable and would confuse the students instead of guiding them as is his main duty.

" On the contrary, in a scholarly book, like my *Introduction*, the purpose is to tell the truth as completely as circumstances permit. I have no an more idea of entertaining the reader than I would have if I were publishing mathematical tables.

" Now my claim is that such scholarly work as I am trying to do (however imperfectly) is fundamental; the diffusion of the results thus obtained, secondary. As long as college deans demand only *teaching* of the history of science without a solid foundation of research, no progress will be made. There may be brilliant teachers, but what of it?

" I am not speaking out of jealousy for I have often been described myself as a brilliant lecturer; yet I am generally disgusted with my own lectures. I do not wish to convince an audience as a lawyer would; that is easy enough, but futile, and it is actually dangerous unless the speaker spends far longer hours in his lab than in the professorial chair. I do not wish my statements to be accepted on credit, as they are in a lecture, but on a solid basis of proof which can only be given in writing.

" To return to the subject, teaching is indispensable in this field as in any other, but is no good unless it be founded upon continuous research. Much research can be, and is, done by individual scholars with relatively few tools, but for the *organization* of this new and *immense* discipline, a large library is needed, plus an apparatus criticus and accumulating archives, which are never complete enough and are growing fast all the time. For the organization of those studies, and the preparation of the fundamental tools (which do not yet exist as they do in other historical disciplines) an Institute is needed.

" When I state that a single man, with a few untrained assistants, does not suffice for that gigantic task, I know what I am speaking of, for I have addressed myself to that very task some twenty-five years ago, and have devoted to it ever since all my time and energy.

" I have tried to indicate in my Third Article the diversity and immensity of that task : the study of science and culture in all ages, times and places. It involves investigation of many kinds, each of which requires a special training and special tools. I have explored and measured the whole field, and begun its scientific exploitation. I know that I cannot finish it, even if I were younger, but I wish I were given the opportunity of training a new team of scholars, in the only place where they can be well trained, a well equipped Institute *ad hoc*.

" As to the *possibilities*, I am agreed with you they are at present very slight. A special endowment would be needed, and no source of it is in view. However, I am convinced that such an Institute will be created sooner or later, more probably perhaps in England, that is, if Europe succeeds in escaping the ominous dangers of war. Such an Institute for the study of the history of science and culture will be someday considered one of the fundamental instruments for the organization of a new and better world.

" As I once put it in *Isis* (vol. 23, p. 22), the Republic needs two kinds of disinterested officers : Statisticians who keep their fingers on the pulse of humanity, and Historians who preserve and transmit its noblest traditions. In both cases the information given is worthless unless it be as accurate as possible; or rather inaccurate statistics and history are not simply worthless, they are dangerous and evil.

" I have no illusions as to the possibility of creating that Institute within my lifetime, and in the meanwhile the work which I have begun must be continued. As my load is steadily increasing while my strength cannot but decrease, I face the danger of breaking down. I have reconciled myself to that danger, and accepted it as the penalty of my ambition. To be sure I will not accept additional loads, and protect myself as much as I can, nor will I worry about the things which I can neither control nor avoid. Thus continuing my work bravely but prudently, I hope to be able to carry the load many more years, and in any case I hope that I may be privileged to die before I break down."

G. S.

Sir William Petty on the Plague

After supping at Sir WILLIAM PETTY's with "divers honourable persons," JOHN EVELYN went home to record of his host that "if I were a Prince, I should make him my second Counsellor, at least. There is nothing difficult to him... there is nothing impenetrable to him." (1) For the possessor of so many-sided an intellect and so broad a training as PETTY to have concerned himself with the plague, especially since he had lived through several devastating visitations, was altogether natural. Indeed as a quondam physician and professor of anatomy, as a social economist and inquirer into every sort of curious phenomena, he was almost bound to pursue some investigations into this ubiquitous mystery. Contrary to a natural expectation, however, these inquiries turned on social rather than on medicinal concerns.

Although PETTY had been physician to the army in Ireland and professor of anatomy at Oxford he had given up both his practice and his specialized interest by 1665. Neither his plans for lessening the plague nor his other scattered comments supplied any substantial medical remedies. During the London Plague he withdrew to Surrey where with two members of the Royal Society, WILKINS and HOOKE, he spent his time "contriving chariots, new rigging for ships, a wheel for one to run races in, and other mechanical inventions." This moved EVELYN to remark that "perhaps three such persons together were not to be found elsewhere in Europe, for parts and ingenuity." (2)

(1) *The Diary of* JOHN EVELYN, 22 March, 1675. PETTY's dates are 1623-1687. Among the varied treatments of PETTY reference need be made here only to three : Lord EDMOND FITZMAURICE, *The Life of Sir* WILLIAM PETTY (London, 1895); W. L. BEVAN, *Sir* WILLIAM PETTY, *a Study in English Economic Literature, Publications of the American Economic Association* (1894), IX, 370-472; C. H. HULL (ed.), *The Economic Writings of Sir* WILLIAM PETTY, *together with Observations upon the Bills of Mortality more probably by Captain* JOHN GRAUNT (Cambridge, 1899), 2 vols.

(2) *The Diary of* JOHN EVELYN, 4 August, 1665.

Of his various contributions perhaps the most comprehensive and certainly one of the earliest was entitled "Of Lessening ye Plagues of London" and was dated October 7, 1667. (3) Notwithstanding their varied character these suggestions were most roughly formulated and at times indeed, as will be seen, actually erroneous and incomprehensible. They deserve the label, often aptly applied to similar documents in the seventeenth century, of "heads of proposals"; their author seems never to have found time or inspiration to make his figures match let alone to fill in the details. Because of the unfinished character a few words have been added here and there to make the suggestions intelligible.

Obviously inspired by and founded on the mortality figures of the recent London Plague, the sketch mixed economics and preventive medicine. PETTY began by estimating that London had 696.000 people who inhabited 108.000 houses. During pestilential years, which were one in twenty, one-sixth of London's population died of the plague, the total mortality in such years being one-fifth of the population. To prevent the spreading of the plague the authorities should close suspected houses and pest houses within half a mile of the city. In a circle about the center of London, within a radius of 35 miles or a day's journey, there lived, according to PETTY, as many people and existed as many houses as in London. Six persons might be carried a day's journey for twenty shillings. A family—that is, six persons—might be lodged three months in the country for four pounds, (4) so the charge of transporting and lodging a family at a medium would be five pounds. (4) By implication PETTY then suggested that half the expected victims could be transported to the country.

In the greatest plague conceivable scarcely 20.000 families would be infected; by this new expedient only 10.000 would suffer, the others being removed at a cost of £50,000 (5). The people which the next plague of London, if unhindered, will sweep away, said PETTY, will probably amount to 120.000 which at £ 70 per head is a loss of £ 8.400.000, the half whereof is

(3) Reprinted in FITZMAURICE, 121-22, and in *Writings*, I, 109 n.

(4) Both FITZMAURICE and HULL transcribed this as "shillings." To make any sense it must be pounds.

(5) This could not be pounds unless the five "shillings" were five pounds.

£ 4.200.000. (6) So £ 50.000 spent in transportation and lodging would be ventured to save £ 4.200.000. No plague had ever carried off one-sixth of the people of all England; poor people in congested areas were the most common victims. Therefore his suggestion would be beneficial to London. Furthermore, since the plague was about three months rising some notice would permit removal. The plague also took about the same time to disappear, being hastened in this respect by cold weather.

Although scarcely concerned with medical remedies, PETTY did suggest a few expedients and commented on others. He considered neither killing dogs, making fires in the streets, nor the use of medicants sure methods of relief, even though such common directions enabled everyone to be his own physician. Concentrating on the larger aspects he recommended that officials choose, in the circle of seventy miles diameter, ten large roomy disjoined houses with water and garden to each, whose inhabitants should be prepared to move at seven days' notice. Convenient wagons or coaches should be prepared to carry away the suspected. Money should be provided and a method devised to furnish pesthouses with medicine; each house also should have books of devotion.

PETTY concluded his roughly drafted items with the suggestion that when one hundred died per week, the plague had begun. He proposed therefore that — apparently assuming that his plans might be adopted — if fewer than 120.000 died, out of the bills of mortality, (7) of all diseases within a year after, he was to have twenty shillings per head for all below and should pay ten shillings per head for all above that number. Every family removed should provide £ 10 for the charge of going and coming and four months' rent. Failing this, the family should pay "a gratuity of £ 2000 with W. P. his insurance."

In *Verbum Sapienti* (8), written contemporaneously with the above

(6) Both FITZMAURICE and HULL transcribed this as £ 7. It must be £ 70, first because in *Verbum Sapienti* PETTY estimated the value of each person in the nation at £ 70, and secondly only by making it £ 70 could he reach £ 8. 400.000, £ 4.200.000, and 50 to 4.200 or one for 84.

(7) Considering PETTY's belief that the bills of mortality underestimated the number of deaths by about 25 per cent, he seems to have played very safe in this proposal. See below note 10.

(8) Although written not later than July, 1667, this first appeared as an appendix to the *Political Anatomy of Ireland* (London, 1691).

suggestions, PETTY estimated that on the basis of national wealth each person could be valued at £ 70 (9). From this followed the conclusion that 100.000 persons dying of the plague, above the usual mortality, brought nearly £ 7.000.000 loss to the kingdom (10); and "consequently how well might 70.000 l. have been bestowed in preventing this Centuple loss?" Yet even though the late mortality by the pest was a great loss to the kingdom, some people regarded it but "a seasonable discharge of its pestilent humours." To which he replied that if the plague discerned "between the well and the ill-affected to peace and obedience, or between the bees and the drones, the fact would determine the question." Since, however, the plague destroyed promiscuously the loss was "proportionable to the benefit we have by them that survive" for the survivors made England worth above £ 600.000.000. If only one person escaped the whole territory and all within it "had been worth but a livelihood for that one," he nevertheless would be "a prey to the next two that should invade him."

As became a man of wide interests, PETTY of course analysed not only England but also other plague stricken areas. Due perhaps to having been in Ireland at about the time of its great plague of 1650, he later commented upon its effects (11). He calculated that, since the population of Ireland was about two and one half times that of London, if the plague was no hotter in Ireland than in England, there must have died in Ireland 275.000 people. But on the basis of a weekly mortality in Dublin of 1.300, he concluded that the London plague was only two-thirds as hot. Therefore, 412.500 persons actually died of the plague in Ireland in 1650. PETTY also noticed the ravages of the plague on the continent and estimated that where the plague in London carried off one-fifth of the people, it carried off two-fifths in such eastern cities as Constantinople and in those of Italy and Spain (12).

In *Another Essay in Political Arithmetick*, scarcely less unfinished

(9) *Writings*, I, 109-110.

(10) PETTY admitted his distrust of the official figures of 68.596 for the London plague and purposely put the figure at 100.000 as nearer the actual mortality. *Writings*, I, 100.

(11) *The Political Anatomy of Ireland*, *Writings*, I, 150-51. This was probably written by 1672, but not published until 1691.

(12) *Writings*, II, 509, 531, 536.

than his plans for lessening the plague, PETTY was dealing with the problems of population and advancing various hypotheses concerning its growth. Before treating the plague in this connection he advanced "two *extravagant* contrary suppositions," first, that the population of London would reach 4.690.000 as opposed to 2.710.000 in the remainder of the country, and, secondly, that London would have only 96.000 as opposed to 7.304.000. These premises entered into his calculations on the effect of the plague on population and the national economy.

He recalled that, one time with another, a plague happened in London once in twenty years or thereabouts; for the last hundred years, between 1582 and 1682, had seen five great plagues, *viz.* 1592, 1603, 1625, 1636, and 1665 (13). It was also to be remembered, he said, that the plagues of London commonly killed one-fifth of the inhabitants. If the whole people of England doubled but in 360 years, then the annual increase was but 20.000, and in 20 years 400.000 (14). But if the city of London should have two millions of people, as it would about sixty years hence, the plague, killing one-fifth of them, namely 400.000 once in twenty years, would destroy as many in one year, as the whole nation could refurnish in twenty. Consequently the people of the nation would never increase.

If, however, the people of London should exceed 4.000.000, as in one place in the essay he had "extravagantly premised," the people of the whole nation would lessen above 20.000 per annum. If people be worth £ 70 per head, as he had elsewhere shown (15), the said greatness of the city would damage itself and the whole nation to the extent of £ 1.400.000 per annum and so *pro rata*, for a greater or lesser number. To determine, therefore, which of the two states, as based on his "contrary suppositions" was best — that is, toward which authority should bend the present state — a just balance ought to be made between the disadvantages from the plague and the advantages accruing from the other particulars

(13) *Writings*, II, 475-76. This essay, probably written in 1681 and published at London in 1683, dealt with the growth of the city of London.

(14) PETTY estimated that the plagues of England in twenty years had " carried away scarce an eightieth part of the people of the whole nation." *Ibid.*, 463.

(15) In *Verbum Sapienti*, *Writings*, I, 109. PETTY variously reckoned the value of a person at £ 69, £ 70, and £ 80. *Writings*, II, 454 n.

above-mentioned (16). To secure this balance, a more exact account of the people and a better rule for the measure of its growth than he had given or was yet able to lay down, was necessary.

PETTY's final contribution to plague sociology appeared in 1687, the last year of his life. In a letter of January 18, he informed his wife's kinsman, Sir ROBERT SOUTHWELL, that he had nine or ten such uses of his doctrine concerning London which one would think should keep him from starving; "one whereof is that whereas the next London plague will probably sweep away 140 thousand people", he hoped to compound with it for the odd 40.000. To this SOUTHWELL replied : "If you leave to posterity the way of putting bounds to the plague, you will be immortall" (17).

The relation of PETTY to the plague can scarcely be summarized without attention to Captain JOHN GRAUNT's *Natural and Political Observations... made upon the Bills of Mortality*. Because PETTY has been credited with the authorship of these *Observations*, both by contemporaries and by later scholars, because he perhaps assisted in the preparation of the third edition (1665) and certainly prepared a fifth edition (1676), and finally because there is a striking identity of viewpoint and of conclusions between GRAUNT and PETTY, we are entitled to give brief consideration to this significant volume, especially since the fifth edition is used here (18). Moreover, it

(16) These included movement from country to city, no civil war, commercial, agricultural improvement, prevention of plague, etc.

(17) Marquis of LANSDOWNE (ed.), *The* PETTY-SOUTHWELL *Correspondence*, 1676-1687 (London, 1928), 252, 265. SOUTHWELL (1635-1702) had an unusually active and varied career. In 1664 he became clerk of the Privy Council; on two later occasions he was envoy to Portugal, negotiating the Treaty of Lisbon; after the Revolution of 1688 he became Secretary of State for Ireland; and in 1690-95 he presided over the Royal Society. Withal he found time to play the country gentleman and scholar and conduct an extensive correspondence with PETTY.

(18) *Writings*, II, 314-435. No less a person than EVELYN declared for PETTY's authorship. *Diary*, 22 March, 1675. HULL (*Writings*, I, xxxix-liv) carefully examines the question and concludes in favor of GRAUNT. This gentleman (1620-1674) was a merchant of London whose *Observations* secured his entrance into the Royal Society where for a time he held an important place. The Great Fire and conversion to the Roman Catholic religion, however, combined to place him at a disadvantage and he dropped out of the Society. His last years seem to have been miserable. His masterpiece appeared first early in 1662; a second edition was called for in the same year. The return of the plague in 1665 inspired two more in that year. A fifth edition came out in 1676, and a sixth in 1759. Meanwhile an anonymous German translation appeared at Leipzig in 1702.

might be suggested that GRAUNT was laying the foundations of some studies which would supply the deficiency appreciated by PETTY when he called for "a more exact account of the people and a better rule for the measure of its growth."

Some general reflections concerning the plague in the *Observations* deserve attention. GRAUNT believed that the troublesome seclusions in the plague time were not "a remedy to be purchased at vast inconveniences" and that the greatest plagues of the city were "equally and quickly repaired from the country." The plague, he thought, had caused the keeping of mortality bills. These bills, however, were not without fault. In the years of the plague, that disease probably carried off "a quarter part more" than were set down, because the report of the searchers was incomplete (19). Of those who were attacked more died than recovered; moreover, the plague greatly increased miscarriages and abortions. Yet let the mortality be never so heavy, the city repaired its loss of inhabitants within two years, which feature lessened the "objection made against the value of houses in London, as if they were liable to great prejudice through the loss of inhabitants by the plague." GRAUNT found the contagion to depend "more upon the disposition of the air, than upon the effluvia from the bodies of men."

No more than PETTY did GRAUNT limit his attention to England. He examined the bills of mortality for Amsterdam, Leyden, Constantinople, Prague, Dantzig, "Conningsburg," Copenhagen, Naples, Rome, Genoa, Bergen, and other cities (20). From this examination he concluded that both northern and southern countries were infected, but in the southern countries plagues were more vehement, beginning and ending more suddenly. He also maintained that the plague was longer rising to its height than decreasing, in the ratio of about

(19) This opinion tallied with that of PETTY who made the same assumption in all his calculations. GRAUNT estimated that while the bills of mortality gave the plague mortality in 1592-93 as 22.165, that of 1603 as 30.561, that of 1625 as 35.417 and that of 1636 as 10.460, the figures could be correspondingly increased by 25 per cent. He further believed that on the basis of percentage of plague deaths to the total, 1603 was the greatest plague year, although more people died of the plague in 1625 than in 1603. In this latter year the proportion was as four to five, whereas in 1625 it was as seven to ten. In 1636, the proportion was only as two to five. GRAUNT was probably correct in his explanation concerning the origin of mortality bills.

(20) *Writings*, II, 401-405.

three to two; in this respect GRAUNT differed from PETTY who estimated the times as about equal.

Little can or need be said in conclusion about PETTY's theories and suggestions : they must stand of themselves. After 1665-66 the plague never again swept over England, although early in the 1720's it threatened so fearsomely that many precautions were instituted, both by Parliament and by physicians. The lack of any opportunity to try out PETTY's ideas, however, need not diminish interest in them. They help to rivet more securely his place in the history of science, a place shared by few, for few men, even in his own most curious century, displayed so great a zest, so inquiring a spirit, and so extensive an interest.

University of Missouri. CHARLES F. MULLETT.

Manchester's Board of Health in 1796

Many readers on early industrialism in England happen on references to the Manchester Board of Health or the Percival Survey of 1796, names given to observations of the industrial poor reported from Manchester between 1796 and 1804. During the last quarter of the 18th century poverty and disease in the chief mill and factory city of the nation, a city of some 65.000 people in 1796, had become so acute that a voluntary Board of Health, one without either official standing or police power, was formed to curb these evils.

"The crowded and miserable habitations of the lowest orders of that town, their inattention to cleanliness and ventilation, together with the extreme poverty attendant on their dissolute manners of life, had conspired to introduce among them the most fatal and infectious disorders." (1)

This Board was the first unofficial group of citizens, who, over a period of years, faced the abuses of an unregulated industrialism, and in giving publicity to its vivid pictures of poverty and disease, the misery of adult and child in home, lodging house and factory it attracted much attention in England, supplying, in fact, a horrifying prelude to the earliest parliamentary labor legislation, that of 1802. Statists already noted the drift to the cities, and humanitarians generally wrote on the lack of decent living provisions for the newly arrived workers. To the physicians came the special task of showing the double danger of an industrialism that incubated disease and lessened the vitality of future citizens by the inhuman exactions of child labor.

It was the spread of typhus during the winter of 1795-96 that led to the creation of the Board. On January 7, 1796, organization started "at a meeting held this day at the Bridgewater Arms Inn, which was very numerous and respectable, to consider proper means to secure the general health of the town and neighborhood

(1) The works, Literary, Moral and Medical of THOMAS PERCIVAL, London, 1807, Vol. I, p. CXCIX.

of Manchester from the contagion of an infectious fever, which has long prevailed amongst the manufacturing poor" (2). The nucleus of the Board was drawn from the staff of the Manchester Royal Infirmary on which the eminent JOHN FERRIAR (1761-1815) and THOMAS PERCIVAL (1740-1804) respectively served as chief-surgeon and physician-extraordinary (3). PERCIVAL's many statistical studies of Manchester, continued from 1771 fully qualified him to marshall medical opinion in furthering the Board's aims. A third worthy, the Elder PEEL (1750-1830), though not a resident of Manchester, also comes in for praise for his fight in the House of Commons in forcing the labor bill of 1802 and the Factory Regulation of 1819 to enactment*.

Borough reeves, constables, church warders, overseers of the poor, Strangers' Friendly Society members, magistrates, physicians, surgeons and apothecaries were invited to join the Board. Their number is not given in the reports, but sufficient joined to sustain the leaders in their three chief objectives. Contagious disease was to be prevented or lessened and isolated when possible; various abuses of industrialism were to be exposed; Manchester's filth spots were to get a long overdue cleaning. Since these apparently successful and novel efforts were made at a time when communities blindly accepted both the presence of endemic contagions and a laissez-faire philosophy of government, many requests came for the Board's reports. The early reports were detached and soon unattainable, so the entire proceedings were gotten together as a duodecimo volume of 266 pages published at London in 1805 (4). This little book with its blue black cover of paper-board titled "Proceedings of the Board of Health in Manchester" is a rarity not found in the British Museum, the chief medical libraries of London, or in the libraries of the United States. The writer was permitted to read it at London last fall, through the kindness of Dr. E. M. BROCKBANK who sent it from Manchester, and this courtesy, with others is here gratefully acknowledged.

(2) Proceedings of the Board of Health in Manchester, p. 1.

(3) CHAUNCY D. LEAKE, PERCIVAL's Medical Ethics — Baltimore, 1927.

(*) ROBERT OWEN, then a resident of Manchester, sponsored the Board. Later, Sir ROBERT (PEEL) served as the Board's president for 27 years.

(4) Manchester Board of Health, Preface.

Typhus.

At the Board's first session on January 7th, Ferriar pictures the homes of his patients (5).

"The number of damp and very ill ventilated cellars inhabited in many parts of the town, is a most extensive and permanent evil. It may be necessary to explain to gentlemen who have not visited such places, that they consist of two rooms under ground, the front apartment of which is used as a kitchen, and though frequently noxious by its dampness and closeness, is greatly preferable to the back-room. The latter has only one small window, which, though on a level with the outer ground, is near the roof of the cellar. It is often patched with boards or paper, and in its best state is so much covered with mud, as to admit very little either of air or light. In this cell the beds of the whole family, sometimes consisting of seven or eight, are placed. The floor of this room is often unpaved, the beds are fixed on the damp earth, but the floor, even when paved, is always damp. In such places, where a candle is required, even at noonday, to examine a patient, I have seen the sick without bed-steads, lying on rags; they can seldom afford straw.

This deplorable state of misery becomes frequently the origin, and certainly supports the progress of infectious fevers. I have been able, in many instances, to trace the infection from cellar to cellar, and to say where it might have been stopped by prudent management on the part of the infected family. But it is likewise very difficult to eradicate the fever, when it seizes a family thus situated. It generally attacks them all in succession, and the convalescents, from their confinement in the midst of infection, have frequent relapses, attended with increasing danger, so that the disease continues in the same spot for several months together. The recovery even of those who do not relapse, is also tedious and imperfect, beyond the conception of any who have not experienced cases of this nature. The want of proper nurses must be added as none of the least evils attending this unfortunate class of people. I have no hesitation in asserting that many lives are annually lost from this cause alone. It is extremely difficult at present to procure a nurse of good character upon any terms, and it is often necessary to employ persons on whom little dependence can be placed, that the sick may not be entirely destitute of assistance.

Great advantages would therefore be derived from removing the infected, and in some instances perhaps the whole family from such dreadful habitations as I have described, into a clean, airy house, which should be provided by the committee, till their own cellars could be white washed and sweetened by slacking quick-lime on the floors. It is a question for the decision of the committee, whether they would prefer renting a house, or building a fever ward for this purpose."

Stressing spread by personal contact rather than by air, a subtlety not appreciated a century before the discovery of fleas and lice as typhus vectors, the Board's medical commitee reports : (6)

(5) *Ibid.* Page 20.
(6) *Ibid.* Page 45, footnote.

"A boy employed at a cotton mill brought the fever into his family at Fleet Street, consisting of his father, mother and seven children. From the scarcity of beds, the infected person slept in turn with the rest of the family, in consequence of which, they all became infected. The disease proved fatal to the mother and one daughter. The family were humanely visited by the mother's sister, who resided in Southern Street. She caught the fever, and communicated it to her daughter, who slept with her. The mother died, and the daughter with difficulty, struggled through the disease.

This family were visited and attended upon by a neighbor in Priestner Street.

This last person became infected by the fever, and imparted it to her husband and one child. The husband, wife and child all perished by the disease.

The fever, after attacking five more of the family, still rages in the house, after an interval of seven weeks from the attack of the first individual.

The fever at Bank-top and the neighborhood began in a house in Briarley Street. It spread from thence to the cellars under Nos. 81 and 85, where six persons in the former, and eight in the latter, were infected. The neighboring houses in Briarley Street, and in the main street, were then attacked. It was carried, by intercourse with relations, to No. 43 Port Street, and to 53 Portland Street. In the latter street, it next spread to Nos. 48, 49, 55, and into several houses in Chorlton Street. At the same time, another source of infection was opened at a lodging house, No. 63 Portland Street. At one time there were 92 fever patients on the list in this district. The disease spread into several respectable families (particularly to a shop over a cellar) in which the fever raged, and proved very fatal in proportion to the number of cases.

At Ashton, upwards of three hundred people received the disease, in consequence of the introduction of one infected person into the cotton mill."

Trying to convince Manchester that an isolation hospital was not a breeding haunt of air spreading contagion, the Board appealed to nearly all the epidemiologists of England. These gentlemen reinforced the opinions of their local colleagues. Dr. JOHN HAYGARTH of Chester, later of Bath, wrote that in 1784 he had established isolated fever wards in Chester's infirmary attic. Typhus or small pox had not spread therefrom, though the ward's windows were opened. This opinion carried weight, being based on a large experience with soldiers and their families moved between London and Dublin (7). Dr. SMYTH of London had overcome a jail distemper among Spanish military prisoners at Winchester in 1780. He recommended fumigation with nitrous acid and washing down with marine acid. Neither he nor others, including PERCIVAL's son ROBERT, then a professor of Chemistry at Dublin, had seen typhus carried by air. A medical student

(7) *Ibid.* Page 5, 7, 151, 168.

at Edinburgh wrote that fomites, not air bore the disease. These views, the Board's aims and appeals for money, were given publicity by the preaching of sermons, by memorials and newspapers. Through these channels, too, citizens were given directions in hygiene, and selfish landlords told to whitewash and clean up their neglected properties. Of this earliest of sanitary campaigns only scant mention is to be found in the medical journals of London and Edinburgh.

The seemingly inevitable objections of certain property holders to the pest house site gave the Board much trouble. At a public protest meeting and in legal opinions they alleged the proposed hospital would be a nuisance if located in the populous infirmary neighborhood rather than on the bare alms-house tract. Dissenting doctors supplied the objectors with adverse particulars. Could not the effluvia go over the walls surrounding the infirmary grounds? Could not the gaddings of nurses carry the contagion? Were not plague stricken ships required to quarantine at isolated islands? Was not a pest house in a populous district a legal nuisance? These fears were successfully quieted by counter-statements of the Board. Authorities agreed that air did not carry typhus, nurses could be regulated, quarantine did not necessitate a far-off island and a public good without the element of private gain was not a nuisance. Later the Board gave a more trenchant reason in self-justification in that it had saved money for Manchester. There had been 327 fewer coffins bought for paupers with a saving of £91 during the two years of its existence, and the Board applauded itself in avowing that it "gave security to the opulent and higher ranks of society besides serving the sick and needy."

In turn, objecting and derelict property owners were scolded for neglecting their premises since many houses were without window-sashes and inmates smashed the glass to get fresh air. Rents were not paid because the tenants were sickened in their "dismal abodes" surrounded by rotting refuse heaps, the effluvia of dunghills, open sewers, stagnant water and badly placed privies. The related subjects of ventilation and smoke nuisance also received the Board's attention. Mr. HENRY, expressing the scientific thought of 1796, gave the mass makeup of atmosphere as being 27 to 28 percent vital air, with 72 to 73 percent azote.

The House of Recovery.

During May, 1796, in four small unused buildings purchased for £ 135, facing the infirmary grounds, the staff set up its temporary fever wards, optimistically calling them the House of Recovery (8). Neighboring landlords might object, but the Board gave its sanction. There were 25 free beds for bad periods and 15 when the contagion lightened. Anyone correctly informing the proper persons of the location of a fresh typhus case received 2 shillings from the Board's secretary, Mr. Bellott, surgeon and apothecary at 10 Oldham Street. If in bad surroundings or very ill, the patient was taken to the House of Recovery in a sedan chair that bore a special mark and the family was warned to clean house. Dr. Haygarth thought this ambulance was excellent, since the chair's linings could be aired and washed, but others feared that contagion might seep through its crevices. The dead body was wrapped in a pitched shroud, and quickly buried. During the first year, 391 patients were admitted, of whom 40 died. But as Manchester even partially cleaned up, and isolated but a fraction of its infected sick, the morbidity so declined that for a period in 1803, there being no newly reported cases, the House of Recovery closed for 9 days. Nevertheless, the Board adhered to its original plan of building a new isolation hospital, for only 2 out of 7 applicants for admission to the temporary one could be accommodated.

Financial support increased as the good results of the work were evidenced. Board members bought yearly voting privileges for a guinea, and trusteeships for 5 guineas. But the city had responded well to the many appeals, church overseers had given 15 guineas yearly and after 1800 the people of substance had increased their donations*. This response was fortunate, for in 1798 came the added burden of scarlet fever care. During 1803 plans for a new hospital of 100 beds, with a separate scarlet fever ward, and costing £ 4500 were accepted. The Board's minutes became scantier in its later years, but in the ninth and final anual report

(8) Frank Renaud, A short History of the House of Recovery, 1885, p. 5.

* An evangelically minded merchant, Nathaniel Gould, gave a total of £ 1000, and is reputed to have given £ 20.000 in support of Peel's labor measures. Alfred, (Samuel Kydd), History of the Factory Movement, London, 1857, Vol I, chapter 5.

the opening of the new hospital on the infirmary grounds in the winter of 1804 is proudly recorded. But the Board did more than erect another building and partly clean Manchester's filth spots, it exposed anew the national danger of child labor in the growing industrialism of England.

Child Labor.

The medical members of the Board had from the first assailed child labor, basing their indictments on both physical and moral grounds; while attempting to reduce the pitiful tolls following on 12 to 16 hours of daily work, they hoped for Parliamentary legislation covering this savage abuse. Thus Dr. S. A. Bardsley (9) observed that children working in the hot, poorly ventilated factories at night and returning homeward during the cold winter mornings were, because of lessened resistance and particular sensitivity to temperature changes, especially liable to sickness. Often too tired to remove his clothes, the child had insufficient sleep during the day, and many homes were without adequate beds. Labor of this sort was cruel and debasing to the young workers to whom, furthermore, amusement and education were barred. In printed directions supplied by the Board, Bardsley cautioned parents to feed and wash the child before sending him to work and to provide a made-up bed rather than space on the floor or fireside for sleep. They were also reminded that rice was better food than tea, and that beds were preferable to gaudy furniture. Such warnings of physical and moral dangers to child and parent, with their national implications, also appear in the Percival Resolutions, January 25, 1796 (10).

"It has already been stated that the objects of the present institution are : to prevent the generation of diseases, to obviate the spreading of them by contagion; and to shorten the duration of those which exist, by affording the necessary aids and comforts to the sick. In the prosecution of this interesting undertaking, the Board have had their attention particularly directed to the large cotton-factories, established in the town and neighbourhood of Manchester. And they feel it a duty incumbent on them, to lay before the public the result of their inquiries.

I. It appears that the children and others, who work in the large cotton-factories, are peculiarly disposed to be affected by the contagion of fever; and that when

(9) *Ibid.* Page 26, 231.

(10) Manchester Board of Health, page 33.

such infection is received, it is rapidly propagated, not only amongst those who are crowded together in the same apartments, but in the families and the neighbourhoods to which they belong.

II. The large factories are generally injurious to the constitutions of those employed in them, even where no particular diseases prevail, from the close confinement which is enjoined, from the debilitating effects of hot or impure air, and from the want of the active exercises, which nature points out as essential in childhood and youth, to invigorate the system, and to fit our species for the employments, and for the duties of manhood.

III. The untimely labor of the night, and the protracted labour of the day, with respect to *children*, not only tends to diminish future expectations, as to the general sum of life and industry, by impairing the strength and destroying the vital stamina of the rising generation, but it too often gives encouragement to idleness, extravagance and profligacy in the parents; who, contrary to the order of nature, subsist by the oppression of their offspring.

IV. It appears that the children employed in factories are generally debarred from all opportunities of education, and from moral or religious instruction.

V. From the excellent regulations which subsist in several cotton-factories, it appears that many of these evils may, in a considerable degree, be obviated. We are therefore warranted by experience, and are assured we shall have the support of the liberal proprietors of these factories, in proposing an application for parliamentary aid (if other methods appear not likely to effect the purpose), to establish a general system of laws, for the wise, humane, and *equal* government of all such works*.

Dr. CURRY of Liverpool (11) and many others visiting the celebrated cotton mills of DAVID DALE at New Lanarck, near the Clyde, had praised the "excellent regulations" of the owner. As a good example, DALE's achievements were exhibited to the mill owners of Manchester in the form of his letter dated February, 1796, answering the inquiries of the Board's chairman, T. B. BAILEY Esq. The letter shows industrialism at ist best, particularly as to bounded children (12) :

"The spinning, and all the other rooms, are of the whole extent of the buildings, without any subdivisions, and are from 120 to 150 feet long, from 26 to 30 feet wide, and all of them in height 10 feet floor to floor, or 9 feet clear of the beams.

2. The spinning rooms contain each about 2000 spindles.

3. Ventilation is greatly promoted by the rapid motion of many parts of the machinery, fresh air is introduced by regularly opening the windows at top, on both sides of the house. To increase the circulation of this still more, air-holes, six inches square, on a level with the floor, are opened below every other window through the walls, at the distance of 14 feet from each other; but these are only

* PERCIVAL's Resolutions with an account of the Manchester Board of Health are to be found in SAMUEL KYDD's Factory Movement, Vol I, p. 27.

(11) *Ibid.* page 79.

(12) *Ibid*, page 54.

of advantage in summer, as the cold in winter precludes the use of them. The means of purification in use are washing the walls and ceilings of the rooms at least once a year, with new slaked lime, weekly washings of the floor and machinery with scalding water, frequent and constant brushing of the walls, ceiling and floor.

4. The greatest number of persons in any one room is 75; in some there are only 50.

5. The hours of labour 11 ½ each day, viz., from six o'clock in the morning to seven o'clock at night, with half an hour of intermission at nine o'clock for breakfast, and a whole hour at two for dinner.

6. The only rules for cleanliness and health, are such as enjoin the practices mentioned in answer to the third query.

7. Seven is the hour of supper; in half an hour after at most, and as much sooner as possible, the teaching commences, and continues till nine o'clock. The schools at present are attended by 507 scholars, in instructing whom there are 16 teachers employed; 13 in teaching to read, two to write, and one to figure, besides a person who teaches sewing, and another who occasionally teaches church music. The mode of teaching is as follow: the course is divided into eight classes, according to the progress of the scholars; to each of these classes one or more teachers are assigned, as the numbers in that state of advancement may require. To the teachers is specified in writing how far they are respectively to carry forwards their scholars; which so soon as they have accomplished, the scholars are transferred to the next higher class, and the teacher receives a small premium for every one so qualified. In their respective classes, the teacher promotes emulation in the usual way, by making the top of the class the post of honor: which is still farther kept up, by the distribution of small rewards every half year, to such as, from an account taken once a fortnight, appear to have been most frequently uppermost. On Sundays, that part of the children who cannot go to church from want of accommodation, are kept busy at school; and in the evenings, after public worship, the usual teachers spend regularly three hours in giving religious instruction, by causing the Scriptures to be read, catechising, etc. (*). Besides these nightschools, there are two day-schools for children too young for work, which, as well as the night ones (excepting the providing their own books), are entirely free of expense to the scholars.

8. The time of hiring differs with the different description of children. Those who agree for a stipulated weekly wage, and who generally are such as live with their parents, are commonly engaged for four years; while such as are received from the workhouse in Edinburgh, or who are otherwise without friends to take charge of them, and who in lieu of wages are maintained and educated, are bound four, five, six or seven years, according to their age, or generally till they have completed their fifteenth year. The mode of hiring is generally by contract of the parents, or curators of the children, in their behalf.

9. The supply of workers for the mills comes either from the native inhabitants of the place, from families who have been collected about the works from the neighbouring parishes, and more distant parts of the country, or lastly from Edinburgh and Glasgow, by the number of destitute children these places constantly afford.

(*) There is accommodation at church for only 150 children; they all go to it in rotation.

10. When fever, or any other epidemical disorder appears in the boarding house, where that description of workers, who do not receive their wages in money are accommodated, the means used to prevent the spreading of the infection are : the immediate removal of the sick to a detached part of the house, and a frequent sprinkling and fumigating of the bedrooms with vinegar. No typhus fever has appeared there for years, but has during that time been in the village, though never general; and in these cases, in so far as circumstances affording the means of judging, never appeared to originate in the mills, or even to be communicated by the intercourse the workers have there with each other.

11. The greater part of the workers are lodged in their parents' houses in the village, in the immediate neighbourhood of the mills, or in the town of Lanark, one mile distant. The principal part of their food, as is usual in the country, consists of oat-meal.

Those who get their maintenance in lieu of wages, are lodged all together in one house. They consist at present of 396 boys and girls. There are six sleeping apartments for them, and three children are allowed to each bed. The ceilings and walls of the apartments are white-washed twice a year with hot lime, and the floors washed once a week with scalding water and sand. The children sleep in wooden-bottomed beds, on bed-ticks filled with straw, which is in general changed once a month; a sheet covers the bed-ticks, and above that are one or two pairs of blankets, and a bed-cover, as the season requires. The bed-rooms are carefully swept, and the windows thrown open every morning, in which state they remain through the day. Of late, cast-iron bedsteads have been introduced in place of wooden ones.

The upper body clothing in use in summer, both for boys and girls, is entirely of cotton, which, as they have spare suits to change with, are washed once a fortnight. In winter, the boys are dressed in woollen cloth; and they, as well as the girls, have complete dress suits for Sunday : their linens are changed once a week. For a few months in summer, both boys and girls go without shoes and stockings. The provisions are dressed in cast-iron boilers, and consist of oatmeal porridge for breakfast and supper, and milk with them in its season. In winter, its substitute is a composition of molasses fermented with some new beer, which is called swats. For dinner, the whole of them have every day, in all seasons, barley broth made from fresh beef; the beef itself is divided amongst one half of the children in quantities of about 7 oz English to each; the other half are served with cheese in quantities of about 5 oz English to each; so that they have alternately beef or cheese for dinner, excepting now and then a dinner of herrings in winter, and fresh butter in summer. To the beef and cheese is added a plentiful allowance of potatoes or barley-bread, of which last they have also an allowance every morning before going to work.

12 and 13. As far as observation with regard to these two queries has extended, the workers when too big for spinning, are as stout and robust as others. The male part of them are fit for any trades, a great many since the commencement of the war have gone into the army and navy, and others are occasionally going away apprentices to smiths, joiners, etc. but especially to weavers, for which last trade, from the expertness they acquire in handling yarn, they are particularly well fitted, and of course are taken apprentices on better terms. The females very generally leave the mills to go to private family service, when about sixteen years of age. Were they disposed to continue at the mills, these afford abundant employment for them at reeling, picking, etc. as well as to many more young men than ever remain at them."

50 Years Later.

Like an echo of 1796 are the depictions of squalor, depravity and misery given by Dr. BARON HOWARD about 1840 in his report to the Poor Law Commission on Manchester's proletariat of the lodging houses. (13)

"The scene which these places present at night is one of the most lamentable description; the crowded state of the beds, filled promiscuously with men, women and children; the floor covered over with the filthy and ragged clothes they have just put off, and with their various bundles and packages, containing all the property they possess, mark the depraved and stunted state of their feelings, and the moral and social disorder which exist." ... "The beds and bedding, being seldom washed or changed, are generally in a most filthy condition, and consisting usually of those porous materials to which contagious vapors are especially liable to attach themselves, the danger of sleeping in them may be well conceived. Even if a bed has been occupied by a fever patient who has died or been removed, it is often immediately used by fresh lodgers, without having undergone any purification."

Severe epidemics raged in 1837-38 and the Board of the House of Recovery repeated the familiar call for cleanliness, ventilation and whitewash. HOWARD quoted FERRIAR's original characterization of lodging house keepers as "fever bed keepers", while the Commission's illustrious Secretary, EDWIN CHADWICK, reporting in 1842, saw fit to append FERRIAR's advice to the laboring classes written in 1800 (14). Improvement followed tardily through various measures, including the National Public Health Act of 1848, confusion with delay being partly referable to the view held by certain conservatives and liberals that such regulation was a governmental intrusion on business. Obviously, the sanitary recommendations of 1796, devoid of police authority, had failed. But the Manchester Board had served the sick and needy, its publicity directed to the national scandal of child labor had impelled to corrective legislation, its House of Recovery had been built and the Board had endured until replaced by the infirmary's board in 1852 when the pauper sick was treated elsewhere (15).

---

(13) General Report on the Sanitary Condition of the Labouring Population of Great Britain, London, 1842, page 358.

(14) *Ibid.* page 441. See also Cambridge Modern History, Vol. XI, page 1.

(15) FRANK RENAUD, a short History of the House of Recovery, p. 19.

In short, a group of citizens had furnished a relieving bit of humanitarianism while mechanical civilization was still in what PATRICK GEDDES called its paleotechnic phase which was also the time of piety and profits.

San Francisco, Calif. HENRY HARRIS M. D.

Frederick Adolphus Wislizenus (1810-1889), Pioneer Meteorologist, Physician and Natural Scientist

The lineage of WISLIZENUS is of Polish origin, and the name was derived from the town Wislicza. From that vicinity JOHANNES WISLICZKY, a Protestant minister, fled to Hungary during the latter part of the sixteenth century. With the passing of years, quite a few members of the family have drifted into German provinces. Some became quite famous and there were many clergymen among them. Among the variations in the spelling of the patronym are : "Wislitzer," "Wislicen," "Wisliceny," and "Wislicenus," the Latin ending having been retained by a medieval ancestor or one of the early post-Renaissance period after he had returned home from a term of greater or lesser length at one or more of the universities, where all instruction was given in Latin. Both the sons of Attorney WILHELM WISLIZENUS at Königsee, in Thuringia, studied theology; and the elder of them, CHRISTIAN ANTON, and his wife, died in 1814, of typhoid fever, which the pastor had contracted while ministering to the souls of sick soldiers in the military hospitals. A maternal uncle, Dr. HOFFMANN, reared their three orphaned children, the youngest of whom is the subject of this sketch.

FREDERICK ADOLPHUS WISLIZENUS, who in his later years signed himself "Dr. A. Wislizenus," having dropped the Frederick some time before 1848, was born on May 21, 1810, at Königsee, in the principality of Schwarzburg-Rudolstadt, Thuringia, Germany. After completing his high school course at the Rudolstadt Gymnasium, he continued his studies at the Universities of Jena, Goettingen and Würzburg, until they were rudely interrupted by his participation in a revolutionary uprising against the

existing Germanic government. He even shouldered a gun in the unsuccessful storming of the Federal Diet (Bundesrath) at Frankfurt on the Main, on April 3, 1833. Failing to obtain the expected support from the citizenry of the city, the attacking body of students was soon overpowered by soldiers from the local garrisons. Many were captured and received prison sentences, but WISLIZENUS managed to escape by fleeing to Strassburg. From there he soon reached Switzerland and entered the newly founded University of Zürich.

There his studies again suffered a brief interruption when he joined a movement to aid GIUSEPPE MAZZINI in his effort to free Italy from monarchical rule. The expedition was disarmed by Swiss troops before reaching the border, so there was nothing for WISLIZENUS to do but to go back to the college, from which he then graduated in Medicine with high honors in 1834. His inaugural thesis of sixteen quarto pages and two plates is entitled : "De propria cranii in puella epileptica deformatione." A copy of it is reposing in the Library of the Surgeon-General of our United States Army at Washington, D. C.

At Zürich, WISLIZENUS had the good fortune of receiving instruction by the great naturalist and medical clinician, JOHANN LUCAS SCHOENLEIN (1793-1864); LORENZ OKEN (1779-1851), who had founded the first German Congress of Naturalists and Physicians (1820); and other brilliant professors of experience as teachers at older centers of learning. So the young doctor, with the best available medical education, went to Paris for a stay to become acquainted with the hospitals at the French capital and the methods employed there. Then he sailed for New York in the fall of 1834, to establish himself in the practice of his profession. He was filled with the same ideas which inspired his efforts at political reform in Germany, and published a number of pamphlets in New York, which he called "Fragments". In this manner he endeavored to arouse a greater interest in public affairs among the German inhabitants of that city; however, only two years later he was attracted toward the West, where many of his compatriots had found permanent homes.

At Mascoutah, St-Clair County, Illinois, where he arrived in the year 1836, he met with a friendly reception; but during the three following years he found the country practice rather

toilsome and poorly remunerative. He decided to locate in St-Louis, but first to make, with his modest savings, an extended journey into the farthest West. Accordingly, in the spring of 1839 he left the banks of the Mississippi to join the annual caravan of fur traders at Westport, Missouri, now part of Kansas City He made the trip on horseback, with his baggage on the back of a mule, riding in the saddle during the day and sleeping on the ground at night. They lived almost entirely by hunting buffalo (bison) and other game which was very abundant in those wild prairie regions and reached the mountains after two months of travel. On the upper Green River, which is fed from the snow-capped peaks of the Windriver-Mountains (now in the State of Wyoming), the trading expedition tarried for a while to exchange goods with thousands of Indians and beaver trappers, only to return to its starting place in Missouri, leaving WISLIZENUS to proceed over the high Rockies onto the plateau beyond, with a large band of homeward-bound Nez-Percés and Flathead Indians. He reached Fort Hall on the Snake River, near the present site of Pocatello, Idaho, the Southernmost trading post of the English who still held Oregon Territory in 1839. There his intended plan to cross the Sierra Nevadas and penetrate into California was shattered for the lack of a competent guide. The intrepid scientist saw no other alternative but to turn his face in the direction from whence he came. So he headed back to Missouri with a few companions. He viewed this journey as a recreational trip, because the circumstances under which it was made and without proper instruments, offered no opportunity to extract its scientific possibilities. Although his observations were soon reported in his native tongue, he exhibited his disappointment by forcefully plunging deeply into the general practice of Medicine in St-Louis. It was also propitious to WISLIZENUS that the writings of Doctor GOTTFRIED DUDEN had lured so many of his fellow-country-people to LACLEDE's carefully chosen site for a metropolis, which was destined to be a civic monument to St-Louis, the revered patron saint of France. In a very short time, WISLIZENUS had a high rating among his professional colleagues, enjoyed a large income derived from the rapidly increasing, thrifty German population, and was an active and conscientious promoter of movements for local civic welfare.

The record of this journey of almost six months duration, printed in the German language in 1840, was translated into English by his son, and published with a biographical sketch in 1912. (The original manuscript of the latter is in the collection of the Missouri Historical Society in the Jefferson Memorial at St-Louis). It begins with a history of the previous surveys and expeditions into the same vast regions and then describes his own adventure. His observations on the flora and fauna are given in considerable detail, and ofttimes display the binomial scientific designation according to LINNAEUS; geologic findings are noted with meteorological reports in a quite entertaining and instructive fashion; and there is also an abundance of ethnological matter about the redskin natives. The use of dried buffalo dung as an emergency fuel and the killing of a buffalo which was so lean that he took only the tongue, are among the unique experiences related on its pages. Finally despite the evident scientific treatment of all the material, the author modestly disclaims any specific knowledge of the natural sciences, but predicts a glorious civilized future for that wild country. The book must have been a revelation for those American contemporaries who could read it.

We do not see the name of WISLIZENUS among the associates of GEORGE ENGELMANN in the founding of the short-lived Western Academy of Science in 1837, because he was then still engaged in serving as physician to trusting ruralists in St-Clair County, Illinois. Nevertheless, he became a member, and with ENGELMANN did his utmost to keep it from dying a natural death; and, when there were no more regular sessions, they discussed scientific subjects with friends at their frequent informal meetings.

By taking charge of Dr. GEORGE ENGELMANN's entire practice in 1840, so that his colleague could be married in Germany to his betrothed sweetheart of ten years' standing, WISLIZENUS was immediately certain of an adequate income. With that introduction to the large and increasing percentage of German-born residents of the city, a less capable man could have expected to earn a competence, so the talented bachelor-doctor of thirty-odd years found his sojourn quite lucrative and subdued his restless adventurous spirit for something more than six annual circuits, before he yielded to the thoughtfully laid plans which must have lurked in his inquisitive mind throughout this entire period.

At any rate, he exhibited a sense of comparative economical security in the spring of 1846, when he started on a personally financed scientific journey of exploration, with an objective that included the whole Southwestern Territory, part of Mexico, and also California. It should have required about eighteen months to end in the autumn of 1847. With this intention, and the necessary assortment of instruments in a horse-drawn wagon, with one assisting servant, he started out to gather all sorts of information concerning an area about which there was little known. If the original outline of procedure had not met with obstructive interference, the ultimate results might have been correspondingly more productive. On the other hand posterity owes a distinct debt of gratitude to that intrepid German scholar for that which he was able to collect.

His recorded observations and experiences of this journey were published in a book, of which the United States Senate, in January 1848, ordered 5.000 copies printed for its own use and two hundred additional for the doctor. It was praised by ALEXANDER VON HUMBOLDT for the light it threw on this previously undescribed region. A German translation was published and sold in Germany two years after the original had appeared in this country.

The main body of the narrative is in the shape of a diary with daily weather notations to September 11, 1846, when he and other Americans were made prisoners of war at Chihuahua, Mexico. A partial record was made for a week or so at the Christmas season 1846, and only when the Relief Expedition under Colonel DONIPHAN arrived on March 3, 1847 and they were freed, were the notations resumed. WISLIZENUS then accepted a temporary appointment as surgeon in the U. S. Army and continued with the soldiery to the mouth of the Rio Grande. There the meteorological observations ended, when a transport ship took them to New Orleans. It is really amazing what he did accomplish despite the encountered vicissitudes incident to the Mexican War, and that he was able to bring back so many specimens. There are also three charts : One shows the route; another smaller one has the various geological formations defined at their precise location; the third is a contour map of the elevations above the sea-level of cities, settlements, and other points along the irregularly curved course of the voyage.

In the "Botanical Appendix", Dr. GEORGE ENGELMANN described some of the plants broughtback home by his friend, WISLIZENUS, and expressed regrets that he could not do likewise with all of it, because a comprehensive library was not available. The more strikingly attractive botanical names in the text are : *Dithyrea* WISLIZENI, *Echinocactus* WISLIZENI, *Delphinium* WISLIZENI and the new genus : "*Wislizenia*". Dr. ENGELMANN treated this material more extensively in his most important work which will be mentioned below. Finally, under the caption "Meteorological Tables", this tale of adventure by Dr. WISLIZENUS contains a seriatim report of the weather conditions along his crooked line of travel. The displayed style and spirit of this unique effort to bring true facts about that wilderness are undoubtedly commendable, particularly as he aimed to serve those succeeding periods which would build mansions on the sites where he found only primitive log huts. There is little wonder that the legislative division in the central government of his adopted land took such prompt cognizance of the fruits of this unselfish enterprise, and distributed them radially by means of the printing press.

Dr. WISLIZENUS went to Washington, D. C., in the early part of 1848, presumably to look after the publication of his book. There he paid seemingly unsuccessful court to Miss LUCY CRANE, the sister to Mrs. CAROLINE MARSH, whose husband, GEORGE PERKINS MARSH (1801-1882), was a Representative in Congress for Vermont at the time. He came back to St-Louis, found there another raging epidemic of Asiatic Cholera and flung himself headlong into the work of relieving its victims. However, when the scourge had become less severe in the spring of the year 1850, he was in a position to renew his attentions to the young lady, who had meanwhile gone to Eastern Europe, because of the appointment of Mr. MARSH as Minister to Turkey. It necessitated a trip to the city on the Bosphorus, where WISLIZENUS arrived in due time to be accepted and united in matrimony at the American Legation at Constantinople on July 23, 1850.

The newly wedded couple started their honeymoon by crossing the Black Sea and then ascending the Danube as far as Vienna, the greatest medical center of the nineteenth century. Then they visited the doctor's birthplace, because an unofficial communication had brought the information that the gracious reigning

prince would not hold the erstwhile rebel to account for the treasonable deed committed seventeen years before. They followed that with a tour of other foreign countries. Nevertheless, they were in Washington, D. C., in May 1851, when their first child, a son, was born.

One would think that Dr. WISLIZENUS would bring his bride forthwith to St-Louis, but that must have been without their immediate plans, for the lady lived with relatives in New England, while he went in search of another location as far South as Panama and westward as far as California. Howbeit, he brought his family to St-Louis in 1852, never again thereafter showing his former restless roving spirit, and not absenting himself from the city for more than a few days at a time.

WISLIZENUS and Dr. GEORGE ENGELMANN were virtually inseparable friends, but it happened not infrequently that they had such radical differences of opinion, that one of them vowed never again to speak to the other. Yet, they could not stay apart longer than a day or two and thus they kept it up until ENGELMANN died. When one went out of town, the other attended his patients, and so it was from 1856 to 1858 when ENGELMANN remained abroad to supervise the work of engraving the plates for his book "Cactaceae of the Boundary." Both were leaders and ranked high as physicians and as natural scientists. Much of this was due to mutual stimulation by cooperation; but, notwithstanding the intimacy of this relationship, it cannot be omitted but only deserves scant place in this sketch.

In the organization of The Academy of Science of St-Louis in 1856, WISLIZENUS was active as a charter member and held many appointive and elective offices therein, including that of president in 1859.

As a learned obstetrician he appreciated the advisability of providing a better education for midwives, who were then still considered as the only necessary attendants in normal, uncomplicated labor. Therefore he was one of the incorporators of the St-Louis School of Midwives in 1854, and a teacher and officer in the institution for many years.

Likewise, when the evident need of proper obstetrical service to indigent expectant mothers was realized, he, too, was at hand as one of the founders of the St-Louis Lying-in Charity and

Lying-in Hospital, on November 30, 1874. From then until it was closed for the lack of funds in 1879, he served on its board of directors.

The foremost local luminaries in diseases of women had the highest estimate of his ability and integrity. So, with ENGELMANN, he was made an honorary member at the founding of the St-Louis Obstetrical and Gynecological Society in 1877.

WISLIZENUS was a founder of the Missouri Historical Society in 1866 and belonged to the St-Louis Medical Society and the German Medical Society of St-Louis (president).

Aside from his two well-known bound volumes, Dr. WISLIZENUS wrote many essays and reports. On account of the incomplete indexing and cataloguing, which was in vogue during his lifetime, it is nigh to impossible to compile a list of all his scientific contributions. The following papers and essays are found in The Academy of Science of St-Louis Transactions :

Indian stone graves in Illinois.
Atmospheric Electricity.
Thoughts on Matter and Force.
The Army Worm (Bombyx Graminis).

There are also innumerable meteorological reports in various publications. Those in the Transactions of The Academy of Science are usually printed in very small type but sometimes cover many successive pages. Those in medical journals are shorter, and directed more toward studying the influence of the weather upon epidemic and other diseases. These observations were generally made six times in twenty-four hours, and cover many years of his life. Long before any organization took up the work, which later was taken over by the Federal Government finally to develop into the United States Weather Bureau, WISLIZENUS recognized the value of this form of service. His systematic tabulations of conditions in St-Louis and its environs were made with meticulous care. They will always remain for comparison with the findings of subsequent observers. His writings on general scientific matters were produced, for the most part, during the prime years of his life. As he became older he concentrated his attention more on the problems of Medicine. However, his meteorological recordings began in the early decades of his manhood and were continued until his vision became so

impaired that he could no longer make the readings on the thermometers, barometers, hygrometers, and other instruments of precision, with his own eyes. How gratifying it must have been to him, that the high authorities of his adopted country had already provided for an indefinite continuance of his own trail-blazing work of research. It is furthermore to his everlasting credit, that his legacy to posterity was an entirely voluntary gift, financed out of his personal earnings from the practice of Medicine. The receipt of two hundred books from the Upper Chamber of Congress in 1850 was merely a courteous gesture of thankful appreciation. It was certainly neither a reimbursement for his outlay nor a compensation for meritorious service.

Among his medical papers are the following :

Case of Rupture of the Heart, *St-Louis Med. & Surg. Jour.*, 8 : 12-14, 1850.

Thrombosis Acutissima, *ibid*, 23 : 29-30, 1867.

Trichinosis and Trichiniasis, *ibid*, 30 : 243-250, 1874.

Elaterin in Dropsy, *ibid*, 1879-80, XXXVIII, 186-190.

Thrombosis Arteriae coronariae cordis, *ibid*, 1879-80, XXXVIII, 507-509.

Gallstone Colic, *ibid*, 1880-XXXIX, 409-411.

Intussusception of the Intestines, *ibid*, 1880, XXXIX, 690-693.

Intussusception, *ibid*, 1882, XLII, 349-351.

Femoral tumor of peritoneal origin, *ibid*, 1882, XLIII, 358-361.

These few examples were found with little effort. There are undoubtedly more such articles, which convey the impression that he was in close touch with the up-to-date medical knowledge of his day.

It is furthermore not surprising that this many-sided man, who was also an accomplished pianist, resorted to poetry as a means for expressing some of his most sacred sentiments. Perhaps his poems were not often printed during his lifetime, but he wrote at least thirty of them; for, in the year following his death that many were published in a memorial booklet by his family for his friends. These rhymes, of different lengths, reflect his inherent character, patriotic democracy, principles of conviction, viewpoint of existence, personal experiences, liberal estimate of living

without the sense of vision, and a resignation to the wish of an omnipotent creator. Some of the important periods of his career are set forth in those German verses, which are possibly destined to be the magnifying lenses, by which posterity may judge his motives and intrinsic moral worth, with an approximate degree of precision.

Up until his health and eye-sight began to fail, Dr. WISLIZENUS kept up his medical practice and writings, but his total blindness and other infirmities made him a sad man during the last several years of his life. There were enough of those who enjoyed reading to him, yet the physical suffering prompted him to look forward with pleasure to the relief which only death could bring. He died peacefully in St-Louis on September 22, 1889, surrounded by his family. In compliance with an expressed wish, his remains were interred at his country estate near Kimmswick, Missouri (about twenty miles south of St-Louis), on a high bluff overlooking the Mississippi River. It was there that he loved to stand and enjoy the beautiful scenery of the Mississippi, below the mouth of the Meramec and with a good view of the hills and valleys over in Illinois. Mrs. WISLIZENUS and other since deceased members of the family are now buried in this small private cemetery, which is enclosed in a neat black iron fence.

As the ranks of those who knew him are becoming thin, it is well to remind a newer generation of the distinguished and useful career of Doctor ADOLPH WISLIZENUS.

REFERENCES

1. H. A. KELLY, Cyclopedia of American Medical Biography, Philadelphia and London, W. B. SAUNDERS Co., 1912.
2. W. BROWNING, The Relation of Physicians to Early American Geology, *Annals of Medical History*, September 1931.
3. E. D. KARGAU, St-Louis in früheren Jahren, St-Louis, Mo., Druck der AUG. WIEBUSCH & Sohn Prt. Co., 1893.
4. W. B. STEVENS, Centennial History of Missouri, St-Louis-Chicago, The S. J. CLARKE Publ. Co., 1921.
5. W. B. STEVENS, St-Louis The Fourth City, St-Louis-Chicago, The S. J. CLARKE Publ. Co., 1909.

6. A. PICK, Die Familie WISLICENUS, *Archiv für Rassen- und Gesellschafts-Biologie*, 15. Band, 1923, pp. 156-172.
7. D. K. GREGER, Dr. FREDERICK ADOLPHUS WISLIZENUS (1810-1889), *Bulletin of The Academy of Science of St-Louis*, Vol. 1, n° 3, March 1935, St-Louis, Mo.
8. A. WISLIZENUS, Gedichte von, St-Louis, A. WIEBUSCH & Son Prt. Co., 1890.
9. A. WISLIZENUS, M. D., A Journey to the Rocky Mountains in the Year 1839, translated by F. A. WISLIZENUS Esq., St-Louis, Missouri Historical Society, 1912.
10. G. J. ENGELMANN, FREDERICK ADOLPHUS WISLIZENUS, *Transactions Academy of Science of St-Louis*, 1892.
11. Obituary notice in *Lancet*, London, 1889, II, p. 936.
12. J. T. SCHARF, History of St-Louis City and County, in two volumes, Philadelphia, LOUIS H. EVERTS & Co., 1883.
13. F. A. WISLIZENUS, De propria cranii in puella epileptica deformatione, 16 pp. 2 pl. 4° Turici, typ. Gesnerianis, 1833.
14. A. WISLIZENUS, Denkschrift über eine Reise nach Nord-Mexiko aus dem Englischen übertragen von GEORG M. VON ROSS, Braunschweig. Drück und Verlag von FRIEDRICH VIEWEG und Sohn 1850.
15. A. WISLIZENUS, Memoir of a tour to Northern Mexico in connection with the Expedition of Colonel DONIPHAN in 1846 and 1847. Washington, TIPPIN & STREEPER, 1848.
16. G. KOERNER, Das Deutsche Element in den Vereinigten Staaten von Nord Amerika 1818-1848, Cincinnati, A. E. WILDE & Co., 1880.
17. F. A. WISLIZENUS, Ein Ausflug nach den Felsen-Gebirgen in Jahre 1839, St-Louis, Mo., Gedruckt bei WILH. WEBER, 1840.
18. W. J. GHENT, FREDERICK ADOLPHUS WISLIZENUS, Dictionary of American Biography, Vol. XX, 1936, p. 431 & 432.

St-Louis, Mo. ROBERT E. SCHLUETER

Wislizenus (F. A.)

DE PROPRIA CRANII
IN PUELLA EPILEPTICA
DEFORMATIONE.

DISSERTATIO
INAUGURALIS PHYSIOLOGICO-PATHOLOGICA.

QUAM
CONSENSU ET AUCTORITATE
GRATIOSI MEDICORUM ORDINIS
IN ALMA
UNIVERSITATE LITTERARIA TURICENSI,
UT SUMMI
IN MEDICINA CHIRURGIA ET ARTE OBSTETRICIA
HONORES RITE SIBI CONCEDANTUR,
DIE XXVII OCTOBRIS ANN. MDCCCXXXIII
PUBLICE DEFENSURUS EST
AUCTOR
FRIDERICUS ADOLPHUS WISLIZENUS
SCHWARZBURGICO-RUDOLSTADIENSIS.

Accedunt duae tabulae lithographicae.

TURICI.
TYPIS GESSNERIANIS.

FIG. I.
Title page of the inaugural dissertation of F. A. Wislizenus.
(Photostatic copy of original in the Surgeon-General's Library at Washington, D. C.)

Ein Ausflug

nach den

Felsen-Gebirgen

im Jahre 1839,

von

F. A. Wislizenus, M. D.

St. Louis, Mo.
Gedruckt bei Wilh. Weber, Herausgeber des „Anzeigers des Westens."
1840.

Fig. 2
Copy of the title page of Wislizenus' account of a journey to the Rocky Mountains in the year 1839.
(Original in the St. Louis Public Library.)

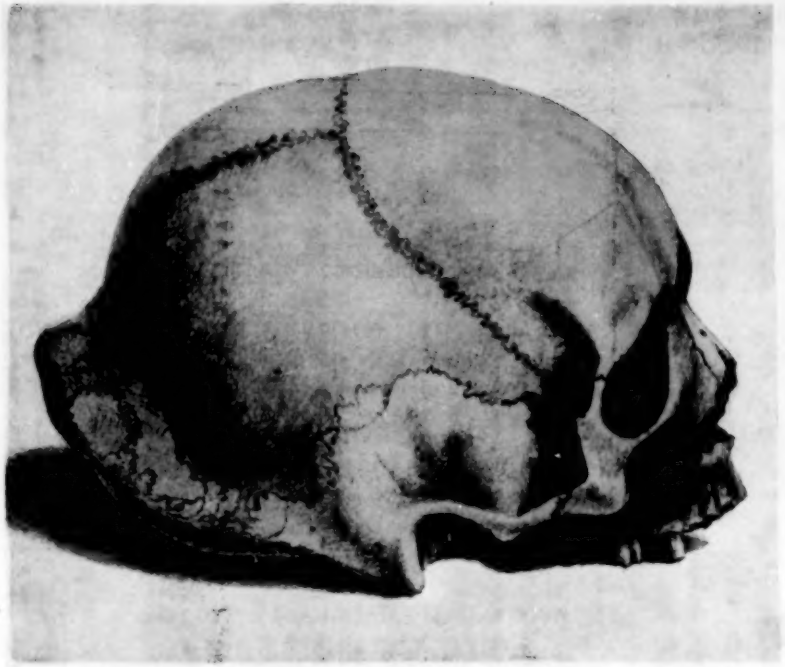


Fig. 3
Illustration from the inaugural dissertation of F. A. Wislizenus.
(Photostatic copy of original in the Surgeon-General's Library, Washington, D. C.)

Fig. 4
Copy of chart in his account of the journey to the Rocky Mountains.
(Original in the St. Louis Public Library.)

A JOURNEY TO THE ROCKY MOUNTAINS IN THE YEAR 1839

By F. A. WISLIZENUS, M. D.

Translated from the German, with a sketch of the author's life, by Frederick A. Wislizenus, Esq.

PUBLIC LIBRARY
ST LOUIS
MO

493272
SAINT LOUIS
MISSOURI HISTORICAL SOCIETY
1912

Fig. 5
Copy of title page of the translation of Wislizenus' Journey to the Rocky Mountains by his son.
(Original in the St. Louis Public Library.)

, Congress, [SENATE.] Miscellaneous.
d Session. No. 26.

V. S.

Mo. Republic with the au thor respec

MEMOIR

OF A

TOUR TO NORTHERN MEXICO,

CONNECTED WITH COL. DONIPHAN'S EXPEDITION,

IN 1846 AND 1847.

BY A. WISLIZENUS, M. D.

PUBLIC LIBRARY
ST LOUIS

9257.

[WITH A SCIENTIFIC APPENDIX AND THREE MAPS.]

...ber 13, 1848.—Ordered that 5,000 copies be printed for the use of the Senate, and 500 additional for Dr. Wislizenus.

WASHINGTON:
TIPPIN & STREEPER, PRINTERS.
1848.

Fig. 6
Title page of Wislizenus' account of his trip to Nothern Mexico.
(Original in the St. Louis Public Library.)

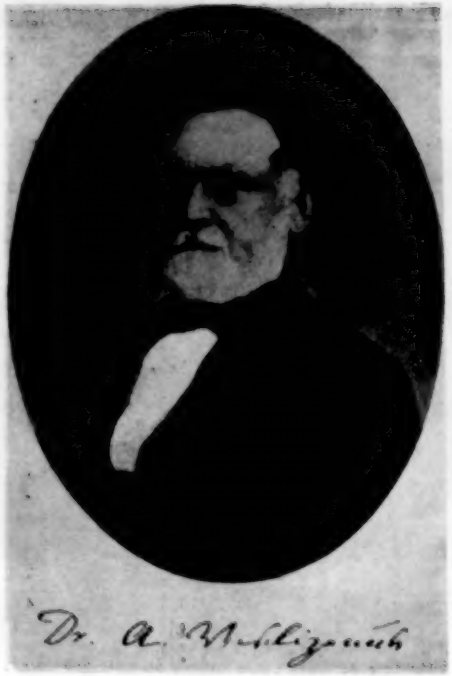


Fig. 7

Copy of portrait of Dr. Wislizenus.

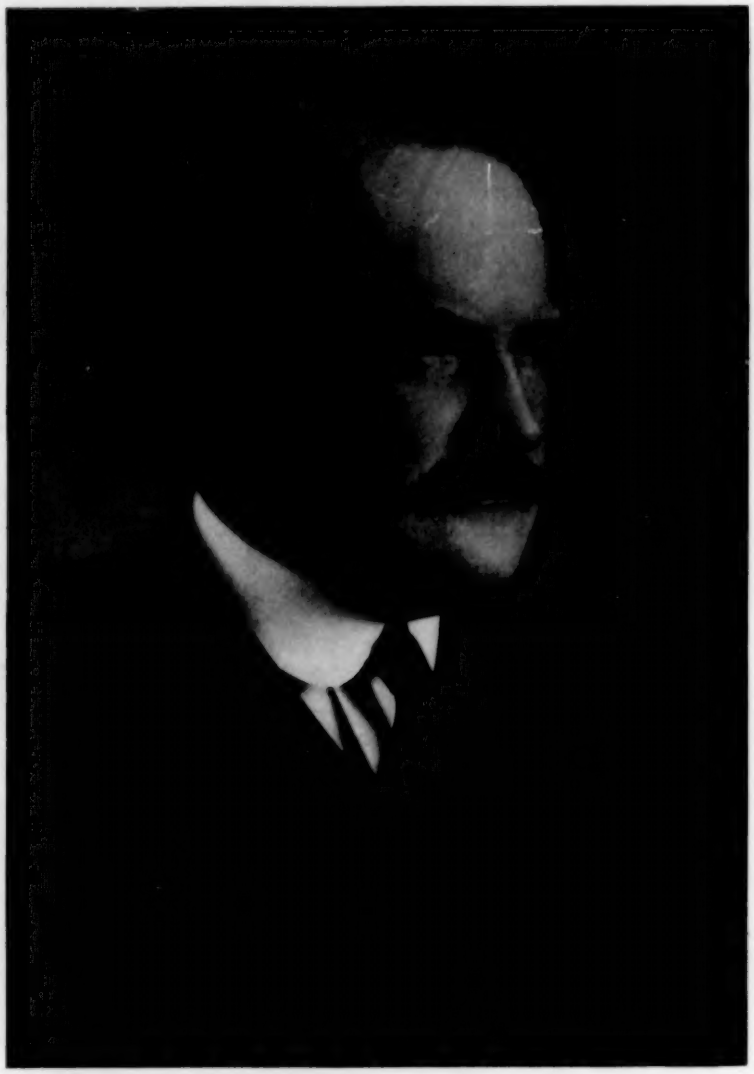
(Original is the frontispiece of the translation of his book by his son in 1912. By courtesy of the St. Louis Public Library.)

Fig. 8

Gravestone of Dr. Wislizenus near Kimmswick, Mo. Mr. Oscar F. Gidionsen who occupies the nearby country residence of Dr. Wislizenus is standing beside it.

(Snapshot by Dr. R. E. Schlueter taken on Nov. 10, 1935.)

(Snapshot by Dr. R. E. Schlueter taken on Nov. 10, 1935.)



CHARLES HOMER HASKINS
(1870-1937)

" Associé étranger de l'Académie des Inscriptions "
Associate editor of Isis from 1924 on.

Isis, XXVIII, (1), pl. 1. LYNN THORNDIKE

UNIV. OF MICH.

Charles Homer Haskins

Although he had been incapacitated for a number of years from further teaching, investigation and writing, CHARLES HOMER HASKINS remained in the minds of most of us until his death on May 14, 1937 the most distinguished of living American historical scholars. His career had been unusually energetic and productive. Born in 1870, already before his twentieth birthday he was an instructor in history at Johns Hopkins and a doctor of philosophy. He then went to Wisconsin, where in two years he became a full professor of history. During his ten-year tenure of this post, during which he appears to have studied further under CH.-V. LANGLOIS at Paris (1), he made an increasing reputation for himself as a medievalist, culminating in a call to Harvard at the opening of the present century. It was not long after his arrival there and the beginning of my own graduate student days that on passing through Cambridge, where my brother ASHLEY was teaching in the summer session, I was introduced by him to HASKINS at lunch at the Colonial Club and attended one of the latter's lectures in the same summer school. Although a vigorous, dynamic and robust personality, HASKINS then, and so far as I know thereafter, threw his whole soul and energy into his work, and could spare no time even during a summer session for sport, exercise and recreation. Possibly his career might have been further prolonged and historical scholarship have been the gainer, had he spent more of his earlier years on insurance of this sort.

GIBBON said that JUSTINIAN " was never young," and HASKINS,

(1) Professor HASKINS referred to LANGLOIS as his master and LANGLOIS in his article, " Travaux de CH.-H. HASKINS sur la littérature scientifique en latin du XII° siècle," *Journal des Savants* (1919), 57-73, alludes to HASKINS' having been among his auditors " au temps déjà lointain où la Faculté des Lettres de Paris essuyait les plâtres encore frais de la nouvelle Sorbonne," without specifying a vear.

a bachelor of arts at the age of seventeen and a doctor of philosophy at nineteen, gave somewhat the same impression. He seemed a mature scholar from the very start of his career. He was to yield in time, however, to the lure of matrimony and to rear a family, but he did not marry young either, being then in his fortieth year.

Meanwhile I can remember reading with envious eyes a long series of articles by him on Norman Institutions in Sicily which ran in the *English Historical Review*. At a time when other American historical students found it exceedingly difficult to get their papers published, HASKINS had the open sesame to the pages of the *American Historical Review* and a host of other journals. It was about this time, too, that he served the American Historical Association for a number of years as secretary. When some distinguished French scholar appeared, it was HASKINS who could compliment him in a fluent French address. At Harvard, I have been told, he devoted much attention to organization and superintendence of the undergraduate general course in history. In 1908 he was made dean of the graduate school of arts and held that post until 1924. He was connected with the Versailles peace conference as Chief of Division of Western Europe in determining the boundaries of Alsace-Lorraine and the Saar region, and in 1920 with R. H. LORD published a volume on *Some Problems of the Peace Conference*. From 1920 to 1926 he was chairman of the American Council of Learned Societies.

These and other administrative positions and honorary degrees or decorations at home and abroad, while testifying to his executive capacity and his prominence in educational and international affairs, will be of less interest to readers of *Isis* than his contributions to the history of science. Even before his personal research in the field of institutional history culminated in the publication of his volume on *Norman Institutions* in 1918 — he continued to inspire the best efforts of his students in this field for many years thereafter—articles on ADELARD OF BATH, on the reception of Arabic science in England, and on various translators like HUGH OF SANTALLA had been appearing in divers periodicals. These and other later papers from his pen on Science at the Court of FREDERICK II, MICHAEL SCOT, and similar topics were combined in a volume published in 1924 under the title, *Studies*

in the History of Mediaeval Science. This is my favorite among all HASKINS' works and one which I always keep within arm's reach as I work at my desk. As SPENSER's *Faery Queene* has been called a poem for poets, so HASKINS' *Mediaeval Science* is a scholar's book for scholars.

In September, 1919, *Isis* resumed publication after the war, but it did not become the official organ of the History of Science Society until 1924, when the society itself was first organized as a result of appeals sent out by Professor DAVID EUGENE SMITH on December 4, 1923 and in January, 1924. A first step, however, had been taken in that direction by a conference on the history of science which I organized at the annual meeting of the American Historical Association at Cleveland in December, 1919, and in which Professor HASKINS heartily participated, along with BURR, TODD, KARPINSKI, CREW, BARNES and LIBBY. At this same meeting HASKINS was chosen second vice-president of the American Historical Association, becoming president of the same in due course in 1922. This conference stimulated the American Association for the Advancement of Science to hold similar sessions in subsequent years, and together with Dr. SARTON's courageous resumption of the publication of *Isis* as Associate of the Carnegie Institution, helped to bring the interest in the history of science in this country to a head. Professor HASKINS further contributed articles to *Isis* and from 1924 on was an associate editor. Besides the memorable session at Cleveland in 1919, two other meetings with HASKINS stand out in my mind, the one in 1912 when he was darting actively about at the British Museum verifying references, the other with a slow-moving, sadly altered figure crossing the little park in front of the Bibliothèque Nationale in the summer of 1929.

Various phases of medieval culture other than science were illuminated by HASKINS' investigations and pen, such as the universities, Latin literature, and the inquisition, and are summed up in his *Studies of Mediaeval Culture* of 1929. His two volumes on *The Normans in European History* (1915) and *The Renaissance of the Twelfth Century* (1927) were general treatments of a topic and period which seem rather less successful than his more specialized studies. However, *The Renaissance of the Twelfth Century* supplied a much needed summary by

an acknowledged master, and its chief fault is that the author out of the richness of his knowledge tries to cram too much into every sentence. If an education so hurried as his, a subsequent life so busy with a variety of occupations and responsibilities, might seem to involve omissions and blind spots somewhere, at least they were not apparent. His mastery of both the original sources and the secondary literature in his field was remarkable : he was a keen and unerring investigator who knew the use of every implement of his trade. Although his active career ceased some years since, his work has not been dulled by time nor superseded by others' labors. It should stand for years to come.

Columbia University. LYNN THORNDIKE.

BIBLIOGRAPHY

A complete bibliography of Professor HASKINS' writings from 1891 to 1929 was compiled by GEORGE W. ROBINSON for the " Anniversary essays in mediaeval history by students of CHARLES HOMER HASKINS presented on his completion of forty years of teaching " (xii, 417 p., Boston, HOUGHTON MIFFLIN, 1929; *Isis* 14, 433-36).

For a shorter bibliography restricted to the history of science and to the period 1912-1930 see *Isis* 21, 545.

The ROBINSON bibliography is apparently complete but at least two of the titles listed by him in 1929 did not actually appear until 1930, being included respectively in the " Homenaje a BONILLA Y SAN MARTIN " (Madrid 1930) and in the " Mélanges PAUL THOMAS " (Bruges, 1930).

The ideas of the ancient Hindus concerning man

For relaxation it has been pleasant to collect from MÜLLER's literal translations of the Sacred Books of the East the data relative to the biological knowledge of the ancient Hindus. Some of this material has already been grouped around specific points of interest and published (1-3).

In this compilation and arrangement, I have presented selected observations on man.

In going through these records the reader will be struck as I have been, not only by the wealth of good observation, but also by the keenness with which it has been made. The absence of verbiage combined with the succinct statement with here and there a suspicion of sly humor arouses admiration for these old and all-too-neglected natural philosophers.

***

Of man's creation it is written that "Pragapati created living beings. From the out-and-in breathings he created the gods, and from the downward breathings the mortal beings (1). From the lower vital airs the mortal creatures" (2). Not a haughty beginning to say the least. "Verily man is born thrice." First he is born from his mother and father. Second he is born by sacrificial offering. And third, by death he is born into the infinite (3). Hence man is spoken of as a sacrificial object, and the soul is fire, rendering the mortal immortal. Fire makes the soul (4-6). Man comes from fire and goes back to fire (7).

He is thus part of the universe (8). "The ether which is around

(1) S. B.- 11, 1, 3, 1. (2) S. B.- 6, 1, 2, 1,-11. (3) S. B.- 11, 2, 2, 5. (4) S. B.- 1, 2, 3, 6. (5) S. B.- 7, 5, 2, 13. (6) S. B.- 2, 2, 2, 4. (7) Khand.-5, 9, 2. (8) Khand.- 1, 7, 1-5.

us is the same as the ether which is within us" (9). "As the spider sends forth and draws its thread, as plants grow on the earth, as from every man hairs spring forth on the head and body, thus does everything here arise from the indestructible "(10). Clearly the fire rites and cremation are based on this concept of man's identity with the universe. They are an actual as well as a symbolical sending back of the individual to the infinite from which he came.

"Now that light which shines above this heaven, higher than all, higher than everything, in the highest world, beyond which there are no other worlds — that is the same light which is within man, and of this we have visible proof. Namely, when we thus perceive by touch the warmth here in the body. And of it we have audible proof, namely, when we thus after stopping our ears listen to what is like the rolling of a carriage, or the bellowing of an ox, or the sounds of burning fire (within the ears)" (11).

This identification of man as an integral part of the universe was a most important part of Hindu cosmogony. Man, being created, is vivified by Atmen getting into the body through the suture of the skull (12). The Atman is in man as the germ which is called seed (13). The deities entered into man each according to his place and becoming. Agni — or fire — entered the mouth and became speech. Vayu — the wind — entered the nostrils as scent. Aditya — the sun — entered the eye as vision. Dis — the regions — as hearing entered the ears. The shrubs and trees became hairs and touch. Kandramus — the moon — entered the heart as mind. Death — as downbreathing — took his residence in the navel. And the waters entered the generative organ as seed (14).

"Man is five-fold. The heat in him is fire; the apertures (of the senses) are ether; blood, mucus, and seed are water; the body is earth; breath is air" (15). "Every man is indeed like an egg. There are two halves of him. This half is the earth, that half heaven. And there between is the ether (the space of the mouth) like the ether between heaven and earth; in this ether there (in the mouth) the breath (air) is fixed, as in that other ether the air is fixed (16).

The types of men are several. There are three general classes. The highest are those who have turned from the world of men and

(9) Khand.- 3, 12, 8. (10) Mund.- 1, 1, 7. (11) Khand.- 2, 13, 7-8. (12) Ait.- 2, 4, 3, 7. (13) Ait.- 2, 5, 1, 2. (14) Ait.- 2, 4, 2, 4. (15) Ait.- 2, 3. 3, 3. (16) Ait.- 3, 1, 2, 6.

yearn to be free. The next are those who wish to become free gradually. And the lowest are those who do not care for immediate or gradual freedom, but who desire nothing but offspring or cattle (17). "Thine on earth are these five races of men" (18). "The earth that holds people of manifold varied speech, of different customs according to their habitations." Yellow-eyed black men from the North are thus identified with wrath (19). "Now the customs peculiar to the North are to deal in wool, to drink rum, to sell animals that have teeth in the upper and in the lower jaw, to follow the trade of arms, to go to sea" (20). "In the southern country — the soil is black on the surface, rough and trampled by the feet of cattle — men attach great importance to bathing, and are pure by the use of water" (21).

Mention is made of the "head of a white-spotted, bald-headed (man) with protruding teeth and reddish-brown eyes " (22).

Thus the nature of man despite his origin from the infinite is not completely beautiful. "This human frame (is said to consist) of seven elements — adeps, blood, flesh, serum of flesh, bone, marrow, semen. It is covered with skin and it has a nasty smell" (23). "This dwelling composed of the five elements, where the bones are beams, which is held together by tendons (instead of cords), where the flesh and blood is the mortar, which is thatched with skin, which is foul smelling, filled with urine and ordure, infested by old age and sorrow, the seat of disease, harassed by pain, gloomy with passion and perishable" (24). "The interior of the body is loathsome" (25). One commentator writes that the body consists of six elements, three of white appearance (fat, bone, marrow) which come from man and the sun; and three of red (skin, flesh, blood) which come from fire and the woman (26).

"Then its hollow head is filled with the brain. A fool led by ignorance thinks it a fine thing. And when it lies dead, swollen and livid — dogs eat it, and jackals, wolves and worms; crows and vultures eat it, and what other living creatures there are. — This body with two feet is cherished (though) impure, ill-smelling, filled with various kinds of stench, and trickling here and there" (27).

(17) Ait.- 2, 1, 1, 4. (18) Arth.- 10, 12, 1, 15 : 45. (19) S. B.- 11, 6, 1, 13. (20) Vas.- 1, 1, 2, 4. (21) Vin. Maha.- 5, 13, 4. (22) S. B.- 13, 3, 6, 5. (23) Vishnu- 96, 43-46 : 51. (24) Manu - 6, 76-77. (25) Gaina. - 1, 2, 5. (26) Ait. - 2, 3, 7. (27) Sutta Nip. - 1, 11, 7-13.

"Oily exudations, semen, blood, (the fatty substance) of the brain, urine, feces, the mucus of the nose, ear-wax, phlegm, tears, the rheum of the eyes, and sweat are the twelve impurities of humans" (28). "The body is a mere relic" (29). "What is the use of enjoyment of pleasures in this offensive pithless body — assailed by lust, hatred, greed, delusion, fear, anguish, jealousy, separation from what is loved, union with what is not loved, hunger, thirst, old age, death, illness, grief, and other evils" (30). "Impure indeed is that part of man where water does not reach him. Now at the hair and beard and at the nails water does not reach him" (31). In all this dismal truth there is one bright ray when the body is called the "divine lute" (32).

"As a mighty tree in the forest, so in truth is man. His hairs are the leaves, his outer skin is the bark. From his skin flows forth blood, from the skin of the tree sap; and thus from the wounded man comes forth blood, as from a tree that is struck. The lumps of flesh are (in the tree) the layers of wood, the fibre is strong like the tendons. The bones are the (hard) wood — within the marrow is made like the marrow of the tree" (33). "As the nature of this man is to be born and to grow old, so is the nature of that plant. As this falls sick when cut, so that falls sick when cut; as this needs food, so that needs food; as this will decay, so that will decay; as this is not eternal, so that is not eternal; as this takes increment, so that takes increment; as this is changing, so that is changing" (34).

Man is distinctively two-footed for "a man walking on two legs and a carriage on two wheels get on" (35).

From all this it is but to be expected that the fate of man is unhappy. Pragapati "above the mortal beings created death as their consumer" (1). "Verily, even in being born, man, by his own self, is born as a debt to death (36). A mortal ripens like corn, like corn he springs up again" (37). The "mortal slowly decaying here below" (38). "This body is transient, it grows weak through old age or becomes weak through illness" (39). "Thou as an old man totterest along on thy staff (40). Look at this dressed up lump, covered with wounds, joined together, sickly, full of many thoughts, which

(28) Manu - 5, 135. (29) S. B. - 2, 1, 2, 9. (30) Mait. - 1, 3. (31) S. B. - 3, 1, 2, 2. (32) Ait. - 3, 2, 5, 3. (33) Brih. - 3, 9, 28. (34) Gaina - 1, 1, 5. (35) Khand. 4, 16, 5. (36) S. B. - 3, 6, 2, 16. (37) Kath. -1, 1, 6. (38) Kath. - 1, 1, 28. (39) Mait. - 1, 2. (40) Brih. - 4, 3, 36.

has no strenght, no hold. This body is wasted, full of sickness, and frail; this heap of corruption breaks to pieces, life indeed ends in death" (41-42). "Without a cause and unknown is the life of mortals in this world. Troubled and brief and combined with pain. Both young men and grown up men, both those who are fools and those who are wise men, all fall into the power of death, all are subject to death (43). For there is not any means by which those that have been born can avoid dying; after reaching old age there is death. Of such a nature are living beings. As ripe fruits are early in danger of falling, so mortals when born are always in danger of death. Birth is attended with pain, decay is painful, disease is painful, death is painful (44). All this is perishable, as these flies, gnats, and other insects, as herbs, trees, growing and decaying. In this world I am like a frog in a dry well (46). You cannot prolong your life — you are past help when old age approaches (47). Old age against which there is no remedy" (48).

"Life drags on towards death continuously, old age carries off the vigor of a man (49). Time elapses and quickly pass the days; the pleasures of man are not permanent; they come to a man and leave him just as a bird leaves a tree devoid of fruit (50).

Birth is misery, old age is misery, and so are disease and death" (51). "Individually a man is born, individually he dies — single and alone like the horn of a rhinoceros" (52-53). Thus the wail of the ages comes down to us from the past and echoes still to-day in Cabell.

As age creeps on "the strong joints become loose, the body is furrowed with wrinkles, the black hair turns white. Man feels every pain and agony from death down to the pulling out of a hair (54). A householder sees his skin wrinkled and his hair white (55). The hair of an aging man shows signs of age, the teeth of an aging man show signs of age, but the desire to live and the desire for wealth do not decay even in the aging man (56). With the deterioration of the perception of the ear, eye, organs of smelling, tasting, touching, a man becomes aware of the decline of life, they after a time produce dotage. He is not fit for hilarity, playing, pleasure, show (57). When

(41) Svetas. - 4, 3. (42) Dhamm. - 11, 147-148. (43) Dhamm. - 5. (44) Sutta Nip. - 111, 8, 1-5. (45) Mait. - 1, 4. (46) Gaina - 1, 2, 5. (47) Utta - 4, 1. (48) Manu - 12, 80. (49) Utta. - 13, 26. (50) Utta. - 13, 31. (51) Utta. - 19,15. (52) Sutrak. - 2, 1, 41. (53) Sutrak. - 2, 2, 70. (54) Sutrak. - 2 1, 42 : 48. (55) Manu - 6, 2. (56) Vas. - 30, 9. (57) Gaina - 1, 2, 1.

your body grows old and your hair turns white the power of your ears decreases, when your body grows old and your hair turns white the power of your eyes decreases, when your body grows old and your hair turns white the power of your nose decreases, when your body grows old and your hair turns white the power of your tongue decreases, when your body grows old and your hair turns white the power of your touch decreases, when your body grows old and your hair turns white all your powers decrease. Despondency, the king's evil, cholera, mortal diseases of many kinds befall you. Your body wastes and decays" (58).

"When freed from the senses the wise on departing this world become immortal (59). When a man departs from hence his speech is merged in his mind, his mind in his breath, his breath in heat, and heat in the highest Being' ' (60). Thus man may go to the infinite if he is wise. "Whoever belonging to us has departed this life, him we cannot gain back so that we should see him with our eyes (61). He who has perceived that which is without sound, without touch, without form, without decay, without taste, eternal, without smell, without beginning, without end, beyond the great and unchangeable, is freed from the jaws of death (62). That Self is a bank or boundary. Day and night do not pass that bank, nor old age, death and grief (63). All who depart from this world go to the moon" (64). "When a person goes away from this world he comes to the wind. From the wind to the sun, from the sun to the moon, from the moon to where there is no sorrow nor snow. Dying he goes to the light. From light to day, from day to the light half of the moon. From the light half of the moon to the six months during which the sun goes to the North. From the months to the year. From the year to the sun. From the sun to the moon. From the moon to lightning" (65).

Perhaps because of this man is bound to wish for offspring (66). "It is from the remote end downwards that the race is propagated" (67). Grandfather-father-son-grandson (68) "Women have been created for the sake of propagation, the wife being the

(58) Utta. 10, 21, 27. (59) Tala. - 1, 2. (60) Khand - 6, 8, 6. (61) Khand - 8, 3, 1; 8, 4, 1. (62) Kath. - 1, 3, 15. (63) Kaus. - 1, 2. (64) Brih. - 5, 10, 1. (65) Khand. - 4, 15, 5. (66). S.B. - 1, 7, 2, 4. (67) S.B. - 1, 4, 2, 4. (68) S.B. - 6, 1, 2, 13.

field, the husband the giver of seed. The field must be given to him who has seed. He who has no seed is unworthy to possess the field (69). The seed of a boy is not productive, whereby in his middle age it is productive, and whereby again in his last stage of life it is not productive "(70). "Progeny is produced in accordance with the seasons, for by seasons people compute (the age of Man) whilst in the state of embryo, and by seasons when he is born "(71). "It is from above that the male approaches the female" (72). Women lie on the left side of men (73). "The male means productiveness" (74). "The seed shedders are the testicles, for only he who has testicles sheds seed" (75).

"The past is the Self for certain is that which is past, and certain also is that which is past. The future on the other hand is progeny, for uncertain is that which is to be, and uncertain also is progeny. The born is the Self for certain is that which is born, and certain also is the Self. The to-be-born on the other hand is progeny, for uncertain is what is to be born, and uncertain also is progeny. And hope is progeny, for uncertain is hope and uncertain also is progeny" (76).

Once born this "growth endowed body" has its childhood, youth, and old age periods (77). "Six months embryos are the last that live when born" (78). The new born child is made to lick butter or to take the breast. He does not eat herbs (79). "As a child joyfully suckling I chafed my mother" (80). "A child tries to speak at the end of a year, for at the end of a year Pragapati tried to speak. When he was first speaking Prapagati spoke words of one syllable and words of two syllables. Whence a child first speaking speaks words of one syllable and of two syllables. At the end of the first year Pragapati rose to stand on these worlds. Whence a child tries to stand up at the end of a year" (81).

"It is that creatures are born here toothless, whereby they (the teeth) grow with them, whereby they (the milk teeth) decay with them, whereby they come to remain permanently with them, whereby in the last stages of life they all decay with them again.

(69) Narada - 12, 19. (70) S.B. - 11, 4, 1, 5-7. (71) S.B. - 7, 4, 2, 31. (72) S.B. - 3, 8, 5, 7. (73) S.B. - 4, 4, 2, 16. (74) S.B. - 5, 1, 3, 10. (75) S.B. - 7, 4, 2, 24. (76) S.B. - 2, 3, 1, 25-28. (77) Mait. - 6, 5, 10. (78) S.B. - 9, 5, 1, 63. (79) Brih. - 1, 5, 2. (80) S.B. - 12, 7, 3, 21. (81) S.B. - 11, 1, 6, 1-4.

Whereby the lower ones grow first, then the upper ones. Whereby the lower ones are smaller and the upper ones broader. Whereby the incisors are larger, whereby the molars of equal size. Creatures here are born with hair. Whereby for the second time as it were, the hair of the beard and arm-pits and other parts of the body grow on them. Whereby it is on the head that one first becomes grey, and then again in the last stages of life one becomes grey all over" (70).

There is not sin much in a toothless child (82). "A child is comparable to an embryo up to his eighth year. A youth who has not yet reached the age of sixteen is called Poganda. Afterwards he is no longer a minor, but independent in case his parents are dead" (83). Puberty in male children marks the beginning of taxation (84).

"Some man, young and youthful, a young man with black hair and in the prime of youth, twenty-five years of age (85). Thou art both young and delicate, a lad in his first youth, possessed of a fine complexion "(86). The hair under the arms is cut for the first time in the sixteenth or eighteenth year. The shaving of the beard takes place in the sixteenth year (87).

"Man is sacrifice. His (first) twenty-four years are the morning libation. The next forty-four years are the mid-day libation. The next forty-eight years are the evening libation" (88). The natural span of life is one hundred years (89). "Man among the animals lives up to a hundred years (90). Man has a life of a hundred years, a hundred powers, a hundred energies (91 ; 92). Short indeed is this life, within a hundred years one dies, and if any one lives longer then he dies of old age (93). Those men who die of old age die in the fullness of time" (94).

Man is of course "the first of the animals" (95). "Difference there is in beings endowed with bodies, but amongst men this is not the case, the difference amongst men in nominal only" (96). "This naked skin among the hides is born upon man (alone).

(82) S.B. - 4, 4, 5, 23. (83) Narada, I, 35-36 (84). Apast. - 2, 10, 26, 12. (85) Sadd. - XIV, 43. (86) Sutta. Nip. - III, 1, 16. (87) Sank. - 1, 28, 18 : 20. (88) Khand. - 3, 16, 1 : 3 : 5. (89) S.B. - 7, 2, 4, 26. (90) S.B. - 7, 5, 2, 17. (91) S.B. - 1, 9, 3, 19 : 4, 3, 4, 3. (92) Vishnu - 20, 15. (93) Sutta Nip. - IV, 6, 1. (94) Milinda - 4, 8, 40. (95) S.B. 6, 2, 1, 8 : 2, 5, 1, 1. (96) Sutta Nip. - III, 9, 13, 18.

All other animals are not naked (97). Now that same skin which belongs to the cow was originally on man. The gods spake — 'Verily the cow supports everything here; come let us put on the cow that skin which is now on man; therewith she will be able to endure rain and cold and heat.' Accordingly having flayed man they put that skin on the cow, and therewith she now endures rain and cold and heat. For man was indeed flayed and hence whenever a stalk of grass or some other objects cut him, the blood trickles out. They then put that skin the garment on him, and for this reason none but man wears a garment, it having been put on him as a skin. Let him then not be naked in the presence of a cow. For the cow knows she wears his skin and runs away for fear lest he should take the skin from her. Hence also the cow draws fondly near to one who is properly clad" (98). Man is sore for having been flayed, hence by anointing himself with butter from the cow to whom his skin was given, his soreness is allayed because he gets his own skin back (99).

"The wild animals of the forest start in fear from man" (100). Winter brings the beasts into man's power (101). "There is a feud as it were between men and snakes" (102). "Cattle, deer, carnivorous beasts with two rows of teeth — and men are born from the womb" (103). "Cattle are more numerous than men" (104).

Man perceives and remembers and anticipates (105). "Health is the greatest of gifts, contentedness the best of riches" (106). "Man sees with his mind and hears with his mind. Desire, representation, doubt, faith, want of faith, memory, forgetfulness, shame, reflection, fear, all this is mind. Therefore even if a man is touched in the back he knows it through the mind" (107).

Man's activities are varied. His chest tones are noted as deep and pitch is recognized (108). "May I be able to form the vowels, to produce, to hold fast, and to utter the guttural, pectoral, dental, and labial sounds" (109). "Would that sound (snoring) stop

(97) Arth. - 9, 12, 3, 51. (98) S.B. - 3,1, 2, 13 - 17. (99) S.B. - 3, 1, 3, 7. (100) Arth. - 5, 5, 21, 4. (101) S.B. - 4,3, 1, 18. (102) S.B. - 4, 4, 5, 3. (103) Manu - 1, 43. (104) S.B. - 2, 3, 2, 18. (105) Ait. - 2, 3, 2, 4. (106) Dhamm. - 15, 203 - 204. (107) Brih. - 1, 5, 3. (108) S.B. - 11, 4, 2, 12. (109) Sank. - 3, 16, 1.

if he bent his body? Yes" (110). "For as much as the step is the briskness of man" (111). "A thousand leagues is the farthest distance" (112). "Long is the night to him who is awake and long is the mile to him who is tired" (113). "Even an undertaking easy in itself is sometimes hard to be accomplished by a single man" (114).

"By means of the arm food is eaten. By means of the hand food is eaten (115). By means of the hands men reach upwards" (116). The forefinger is the foodeater (117). "Whilst whirling round, be it standing or sitting, or even sleeping, how often does man otherwise from toil, breathe and expel the air regularly by day and night. A hundred hundred and eight hundred hundred — so often does man regularly breathe and expel the air by day and night" (117). Which is pretty good physiological observation.

Pragapati rubbed his hands for an offspring — because of this man's hands are hairless on the palms (119).

"The essence of plants is man, the essence of man is speech (120). Man thus consists of the essence of food (121). Whatever food a man consumes in this world, that in return consumes him in yonder world (122). Hunger is the worst of diseases, the body the greatest of pains" (123).

The customs of man in ancient Hind were these. He "wipes off the nit or lice from his head" (124) and he cleans his teeth with a stick (125); "instruments for removing wax from the ear" were used (126), and "there are two kinds of rope, twisted towards the right and twisted towards the left. The right ropes serve for some animals the left ropes for others" (127). Three kinds of needles were used, copper, silver, and gold (128). And a burning glass for starting a fire was a common possession (129) as were stone weapons (130).

"Let no man try to find out what speech is. Let him know the

---

(110) Milinda - 3, 7, 11. (111) S.B. - 12, 9, 2, 5. (112) S.B. - 9, 1, 1, 28. (113) Dhamm. - 5, 60. (114) Manu - 7, 55. (115) S.B. - 10, 2, 2, 7. (116) S.B. - 12, 1, 4, 3. (117) S.B. - 12, 2, 4, 5. (118) S. B. - 12, 3, 2, 7-8. (119) S. B. - 2, 2, 4, 4. (120) Khand. - 1, 1, 2. (121) Tait. - 2, 1. (122) S.B. - 12, 9, 1, 1. (123) Dhamm. - 15, 203-204. (124) Gaina - 2, 13, 18. (125) Apast. - 1, 2, 8, 22. (126) Kulla. - 5, 2, 8, 2. (127) Ait. - 1, 2, 3, 9. (128) S.B. - 13, 2, 10, 3. (129) Milinda - 2, 3, 5. (130) Khand. - 1, 10, 1.

speaker" (131). "A huntsman traces the vestiges of a wounded deer in a thicket by the drops of blood" (132). "Sitting one milks the cow" (133).

Clothes were made of wool, silk, hemp, palm-leaves, cotton, goat-hair, common cotton, Bengal cotton, bark fibres, muslin, deer-fur, grass, leaves, skin, and the feathers of an owl (134-135).

"A document must be written upon a piece of cloth or a copper plate" (137). "A monk or a nun should not make colored clothes colorless or color colorless clothes" (136). Interest is on a percentage basis (138).

"When visitors have arrived, ointments for the eyes and feet are given them. Such indeed are human means of embellishment and therewith they keep off death from themselves" (139).

"They said 'Take him down to yonder pool, and he shall come forth with whatever age he shall desire." (140). Which is perhaps a first note on the fountain of youth.

Of punishment, castration and death was meted out for fornication with the wife of a teacher (141). Footmarks were used in identifying thieves (142). "Justice depends on truth, and litigation on witnesses" (143). There are "ten places of punishment. The privy parts, the belly, the tongue, the two hands, and fifthly the two feet; as well as the eye, the nose, the two ears, the property, and the body" (144). Otherwheres it is written "both hands, both feet, the male organ, the eye, the tongue, both ears, the nose, one half the feet, the thumb and index finger, the forehead, the lips, the hindpart, and the hips. These fourteen places of punishment have been indicated" (145). Gentle folks these ancient Hindus.

"When the mother has died all the uterine brothers and the uterine sisters shall equally divide the mother's estate" (146).

"Learning, wealth, age, relationship, and occupation must be honored. But each earlier named quality is more venerable than the succeeding ones" (147).

(131) Kaus. - 3, 8. (132) Narada -Introduction 38. (133) S.B. - 9, 1, 2, 14. (134) Gaina. - 2, 5, 11. (135) Vin. Maha. - 8, 28, 2. (136) Gaina. - 2, 5, 2. (137) Vishnu - 3, 82. (138) Vishnu - 6, 4. (139) S.B. - 13, 8, 4, 1. (140) S.B. - 4, 1, 5, 12 (141). Apast. - 1, 9,25, 1. (142) Narada - 17; 14, 22. (143) Narada - 6, 5. (144) Narada - 36-37. (145) Brih. - 27, 9-10. (146) Manu - 9, 192. (147) Vas. - 13, 56-57.

"Now various indeed are the customs of the different countries and the customs of the different villages. Those one should observe at the wedding" (148).

After marriage "through a period of three nights they shall eat no saline food; they shall sleep on the ground; through one year they shall refrain from conjugal intercourse, or through a period of twelve nights, or of six nights, or at least of three nights" (149). The husband is the enjoyer, the wife the one to be enjoyed (150).

Prior to marriage "the man must undergo an examination with regard to his virile; when the fact of his virile has been placed beyond doubt, he shall obtain the maiden but not otherwise. If his collarbone, his knee, and his bones in general are strongly made; if his shoulders and his hair are strongly made; if the nape of his neck is stout and his thigh and skin delicate; if his gait and his voice is vigorous; if his semen when thrown into water does not swim on the surface; and if his urine is rich and foamy; by these tokens may a potent man be known; and one impotent by the opposite characteristics" (151).

"Affliction with a chronic or hateful disease, deformity, the loss of her virginity, a blemish, and proved intercourse with another man; these are declared to be the faults of a maiden. Madness, loss of caste, impotency, misery, to have forsaken his relatives, and the first two faults of a maiden; these are the faults of a suitor" (152).

A wife is half of a man's self (153). The family association is three-fold; father-mother-son (154). "Of the two parents the father has the greater authority, because the seed is superior to the womb" (155). Yet it is true that "pregnant women order their husbands about like slaves to the fulfilling of their cravings. When a son, the reward of their wedded life is born, the mother bids the father to hold the baby or to give it to her. Thus some supporters of their sons have to carry burdens like camels. Getting up in the night they lull the baby asleep like nurses; and though they are ashamed of themselves, they wash the clothes

(148) Sank. - 1, 7, 1. (149) Sank. - 1, 8, 21. (150) S.B. - 1, 8, 3, 6. (151) Narada - 12, 8. (152) Narada - 12, 35-36. (153) S.B. - 5, 2, 1, 10. (154) S.B. - 8, 6, 2, 2. (155) Narada - I, 37.

like washermen. This has been done by many men who for the sake of pleasures have stepped so low. They become the equal of slaves, animals, servants, beasts of burden, mere nobodies" (156).

"A man aged thirty years shall marry a woman of twelve who pleases him, or a man of twenty-four a girl eight years of age" (157). "A youth who is in the prime of life is apt to become dear to women, the beautiful formed maiden is apt to become dear to man" (158). "For thus shaped they praise a woman; broad about the hips, somewhat narrower between the shoulders, and contracted in the middle (159). Wider behind, broad-hipped, thus they praise a woman (160). The mouth of a woman is always pure" (161) and her fragrance is good (162). "Her eyes were similar to the leaves of the blue lotus (of which the bow of Kama the god of love is made); her face was radiant like the moon in autumn season, her locks were as dark as a swarm of black bees; she was radiant; her lip was red like the Bandhugiva flower; and she was lovely to behold. Her eyebrows were fine; her teeth exceedingly small; her nose handsome; her brows bent; her neck shaped like a shell; her thighs were constantly touching each other; and they were fleshy thighs which adorned her loins. Her breasts were shining white; firm; plump; very close to each other (decorated with continuous strings of pearls) like the projections on the forehead of Indra's elephant, and radiant like the gold (of the two golden jars used at the consecration of a king). Her arms were as delicate as lotus fibres; her hands were similar to young shoots; her thighs were resplendent like golden pillars; and her knees hidden (under the flesh) and closely touching each other. Her legs were smooth and exquisitely proportioned; her feet exceedingly graceful; her loins fleshy; and her waist like that of a lion's cub. Her reddish nails shone like rubies; her beauty was the delight of every looker-on; and with her glances she filled at every step all the quarters of the sky as it were with lotus flowers" (163).

"A long-haired man is neither man nor woman; for being a

(156) Sutrak. - 1, 4, 2, 15-18. (157) Manu - 9, 94. (158) S.B. - 13, 1, 9, 8 : 16. (159) S.B. - 1, 2, 5, 16. (160) S.B. - 3, 5, 1, 11. (161) Manu - 5, 130. (162) Apast. - 1, 2, 7, 8. (163) Vishnu -1, 22-27.

male he is not a woman; and being long-haired (a eunuch) he is not a man" (164). "The eunuch is neither woman nor man — the eunuch is something unsuccessful among men" (165). A castrated bull "is neither male nor female. For being a male it is not female and being a female (unmanned) it is not male" (166). "There are to be seen in this world men who have become women and women who have become men" (167).

"The male represents energy — the female on the other hand is without energy (168). Strength means manliness (169). Strength is erect (170). Pragapati bestows manliness on men. The male is equivalent to power. In creation women were originally male or possessing manhood of which they were deprived by the thunderbolts of the gods fearful of bestowing manhood on women (171-172).

"A female injures no one" (173). Vital power is extinct in women (174). A woman's vigor is up to her hips (175).

"Husbands doubtless are the support of women" (176). The husband is the enjoyer, the wife the one to be enjoyed (177). "To be mothers were women created, and to be fathers men" (178). "The seed of man is a form of Aditya" (179).

"The offering spoon is the female and the dipping spoon the male" (180). Curds of milk are female and the whey is male or seed. The thumb and great toes are male; the fingers and toes female. The ears are male, the eyebrows female. The lips are male and the nostrils female. The teeth are male and the tongue female (181).

"Speech is female (180). Truth is male and faith is female" (182). The mind is male (183). "The understanding of females is apt to waver (184) a woman is never fit for independence" (185). "A woman from want of veracity" is never a good witness (186). "Women betray secret counsel" (187). There is certain knowledge (intuition) only possessed by women (188).

(164) S.B. - 5, 1, 2, 14. (165) S.B. - 12, 7, 2, 12. (166) S.B. - 5, 5, 4, 35. (167) Milinda - 4, 7, 11. (168) S. B. - 2, 5, 2, 36. (169) S.B. - 3, 3, 4, 7. (170) S.B. - 3, 3, 4, 7. (171) S.B. - 9, 4, 1, 6. (172) S.B. - 4, 4, 2, 13 : 12. (173) S.B. - 6, 3, 1, 39. (174) S.B. - 12, 7, 2, 11. (175) S.B. - 13, 8, 3, 11. (176) S.B. - 2, 6, 2, 14. (177) S.B. - 1, 8, 3, 6. (178) Manu - 9, 96. (179) Ait. - 2, 3, 7, 3. (180) S.B. - 2, 4, 4, 21. (181) S.B. - 10, 1, 1, 8. (182) S.B. - 12, 8, 2, 6. (183) S.B. - 1, 4, 4, 3. (184) Manu - 8, 77. (185) Vas. - 5, 2. (186) Narada - I, 191. (187) Narada-VII, 150. (188) Brih. - 4, 5, 1.

The menstrual blood of women is a form of Agni (177). "Impure indeed is that part of woman which is below the navel" (189). A woman in her menses is impure (190). Yet -

"The heart of the lusty male hankers after the women" (191) and "in this world men have a natural liking for women. A wise man knows women are a slough" (192). But men must sport with the organ (193).

"The world is greatly troubled by women (194). Women, those female demons, on whose breasts grow two lumps of flesh, who continually change their mind, who entice men and then make sport of them as of slaves (195). Truly there is no friendship with women, and theirs are the hearts of hyenas" (196-197)

REFERENCES

Abbreviations. Volume number in MULLER'S *Sacred Books of the East series.*

Ait.-Aitareya Aranyaka Upanishad, Vol. 1 : Anug.-Anugita, Vol. 8 : Apast.-Apastamba, Vol. 2 : Arth.-Artharva Veda, Vol. 42 : Bhag.-Bhagavadgita, Vol. 8 : Brih.-Brihadaranyaka Upanishad, Vol. 15 : Dhamm.-Dhammapada, Vol. 10 : Gaina. Ak.-Akaranga Sutra, Vol. 22 : Gaut.-Gautama, Vol. 2 : Hiran.-Hiranyakesin, Vol. 30 : Kalp.-Kalpa Sutra, Vol. 22 : Kath.-Katha Upanishad, Vol. 15 : Kaus.-Kavshitaki Upanishad, Vol. 1 : Khand.-Khandogya Upanishad, Vol. 1 : Kulla.-Kullavaga, Vols. 17 & 20 : Maha.-Mahavagga, Vols. 13 & 17 : Maha. P.-Maha-Parinibbana Sutta, Vol. 11 : Mait.-Maitrayana-Brahmana, Vol. 15 : Manu-Laws of Manu, Vol. 25 : Milinda-Vols. 35 & 36 : Mund.-Mundaka Upanishad, Vol. 15 : Narada-Vol. 33 : Prasna.-Prasna Upanishad, Vol. 15 : Sadd.-Saddharma Pundarika, Vol. 21 : Sanat.-Sanatsugatiya, Vol. 8 : S. B. -Satapatha Brahmana, Vols. 12, 26, 41, 43 & 44 : Sank.-Grih. Sankayana, Vol. 29 : Sutta Nip.-Sutta Nipata, Vol. 10 : Sutrak.-Sutrakritanga, Vol. 45 : Svetas.-Svetasvat, Vol. 15 : Tala.-Talavakara Upanishad, Vol. 1 : Tait.-Taitiriyaka Upanishad, Vol. 15 : Utta.-Uttaradhyayana Sutra, Vol. 45 : Vas.-Vasistha, Vol. 14 : Vin.-Maha.-Mahavagga, Vols. 13 & 17 : Vishnu-Institutes of Vishnu, Vol. 7 : Vais.-Vaisesika Sutras of Kanada.

(189) Sank. - 1, 18, 1. (190) Gaut. - 14, 30. (191) Arth. - 7, 6, 70, 1. (192) Utta. - 2, 16. (193) S.B. - 11, 5, 2, 4. (194) Gaina - 1, 2, 4. (195) Utta. - 8, 18. (196) S.B. - 11, 5, 1, 9. (197) Manu - 9, 15.

Vol. VI of The Sacred Books of The Hindus. Ed. by B. D. Basu. Allahabad. 1911 : Yati — Rules for Yatis, Vol. 22.

***

1. HAMMETT, F. S. Heredity concepts of the ancient Hindus. *Scientific Monthly*, *27*, 452-455 (1928).

2. HAMMETT, F. S. The anatomical knowledge of the ancient Hindus. *Annals of Medical History*, *1*, 325-333 (1929).

3. HAMMETT, F. S. The conceptual psychology of the ancient Hindus. *Psychoanalytic Review*, *XVI*, 291-311 (1929).

Philadelphia FREDERIK S. HAMMETT

Pictorial representations of alchemical theory

While we cannot at present produce artificial gold, it is possible nevertheless to describe a process by which that production may infallibly be accomplished. If we take the ultimate constituents of matter (protons, electrons, and neutrons according to the best opinion at present) and put them together in the proper fashion, we shall produce gold. The prescription is simple and it will certainly work if only we can find the means of working it. Unfortunately however protons, electrons, and neutrons cannot be juggled like billiard balls.

Equally simple was the prescription of the alchemists. In accordance with the prevalent opinion that metals and all other material things were the result of the combination or interaction of two prime contrary principles, the alchemists believed that if these two could be brought together and made to interact or combine under proper conditions then real gold, the Philosopher's Stone, the pill of immortality, and the Grand Elixir would be produced. This simple and rational theory seems to have been the central feature of alchemical doctrine. It is this that the genuine alchemical writings are always discussing subject to varied emphasis or to interest in one or another of the objectives of alchemy. Understood from this point of view the writings are intelligible. They describe a process which, although difficult, would in the light of the chemical knowledge of their time certainly be expected to work.

The doctrine of the two contraries in its general form, as philosophy and science, as religion and nature theory and world concept seems to have prevailed in Egypt from the earliest times. It appeared in China in the third on fourth century B.C., full grown and already associated with numerous occult connotations,

in a state of maturity which indicates that it was probably an importation into that country (1).

The positive and active principle was identified with the sun, the male, dry, light, and fiery; the negative and passive principle with the moon, female, moist, heavy, and cold. When men became interested in the chemical properties of metals, they of course supposed them to be the result of the confluence of the two groups of opposite forces and qualities, or, in other words, of the combination of the two contrary principles. ZOSIMOS and the Alexandrians of about the third century A. D. called the positive fiery principle Sulfur and the negative material principle Mercury, and supposed all metals to be combinations of the Sulfur and Mercury principles. JABIR taught the doctrine in the eighth century, ALBERTUS MAGNUS and ROGER BACON continued it, BECHER in the seventeenth century gave the name of *terra pinguis* (fat earth) to the Sulfur principle, STAHL shortly afterwards renamed it *phlogiston* (the fiery entity), and the doctrine dominated chemistry until the time of LAVOISIER. Alchemy, understood as the pursuit of transmutation and the elixir, does not seem to have been practiced by the Alexandrians but first appeared in Europe among the Arabs of about the eighth century (2). From that time onward the Arab and Latin alchemists describe the preparation of the Philosopher's Stone in the language of the Sulfur-Mercury doctrine. Their writings are illustrated with pictures and symbolic diagrams which represent sometimes the chemical theory that the seven metals result from combinations of the prime two, sometimes the alchemical theory that by a combination of the same two principles the great work may be accomplished.

In the picture which is reproduced in FIG. I, (3) the sun and the moon (both above and below) evidently represent the positive and the negative principles, Sulfur and Mercury, from which all seven of the metals (above and below) are produced. At the same time they probably also represent specifically gold and

(1) *Isis*, *18*, 216-222 (1932); *25*, 327-340 (1936).

(2) Compare "The Problem of the Origins of Alchemy", *Scientific Monthly*, *43*, 551-558 (1936).

(3) *Museum Hermeticum Reformatum et Amplificatum*, Frankfurt, 1678. This picture and four large folding plates follow the Preface and precede the title-page of the *Aureus Tractatus de Philosophorum Lapide* with which the numbering of the pages commences and to which the picture apparently pertains.

silver, the other five metals, unspecified, being represented by stars. The seven metals within the earth are further represented by the seven human figures. The significance of the three figures seated beneath the trees in the upper half of the picture is definitely alchemical, as is also that of the verse at the bottom —

Quæ ſunt in ſuperis, hæc inferioribus inſunt:
Quod monſtrat cælum, id terra ſreguenter habet
Ignis, Aqua et fluitans duo ſunt contraria: felix,
Talia ſi jungis: ſit tibi ſcire ſatis.
D. M à C. B. P. L. C.

Figure I.

Chemical and Alchemical Diagram from *Museum Hermeticum Reformatum et Amplificatum*, Frankfurt, 1678.

"Happy art thou if thou join such things (the two contraries); and let this be enough for thee to know!" The up-pointing triangle represents fire, the positive Sulfur principle; the down-pointing triangle water, the negative Mercury principle; the combination of the two the Philosopher's Stone. The latter symbol is also the "seal of Solomon" representing wisdom, and further contains within itself the symbols of the four Aristotelian

Figure II.
The Fourth Key of Basil Valentine.

Figure III.
The Twelfth Key of Basil Valentine.

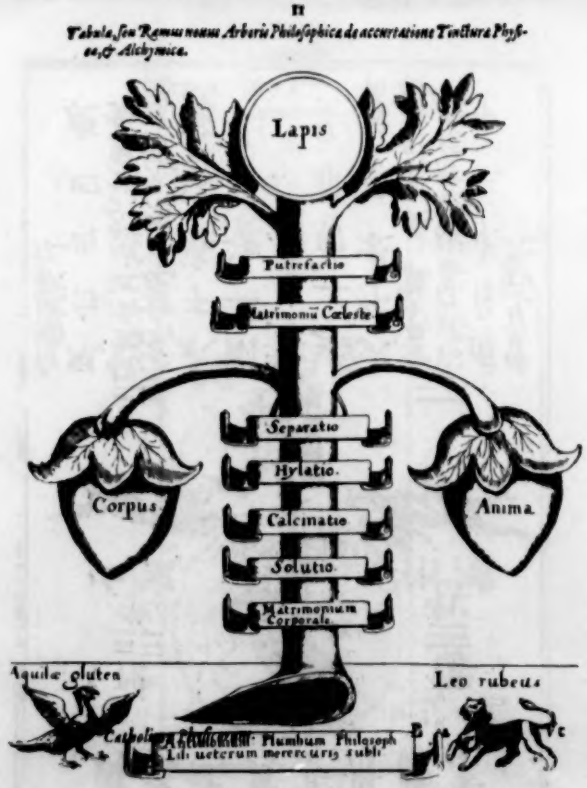


Figure IV.

An Alchemical Diagram of SAMUEL NORTON of Bristol.

Figure V.

The Interaction of the Figure and the Thing.

Figure VI.
A Diagram of the Medicine Laboratory of TZŬ-YANG.

A Diagram of the Medicine Laboratory of Tzŭ-Yang.
Yin
Female
Blood Door Breath
True Earth
The Earth having no definite form comprises four manifestations and yields the true metal and so forms the medicine.
Yang
Male
Mind Gate Spirit
FORMS
Like dust on a mirror
Like corn and rice
Like pearls
(Water)
(Fire)
Soft Fire Golden Tripod(Sun) Jewelry Rain Bronze
Duplicate Moon Red Dragon(Lightning) Kung-Lin(Mountain) Green Eight
South Outer corpses Daytime Seven East
Red Jih(Sun) earth Liver of Wu(Jupiter) Thunder Three
Sun Scarlet Vermilion Bird(Southern constellation) Wood Chia (The first of the climes)

Figure VII.
Translation of Figure VI.

Figure VIII.
The Golden *Wu*. "Fire, the Form of the Sun, the Spirit of Flame."

Figure IX.
The Jade Rabbit Pounding Drugs. "Water, the Form of the Moon, the Soul of Gold Vapor."

elements, namely the up- and down-pointing triangles (fire and water) and the same triangles with horizontal lines across them (air and earth). The four elements supply a vocabulary and background for any discussion of material things and are so represented by appropriate symbols at the four corners of the large square, opposites in opposite corners, fire (the salamander in flames) opposite to water (the ship, the whale, and the waves), earth (the landscape) opposite to air (the winds).

Figure II (4) represents the marriage of the two principles for the production of the Philosopher's Stone, the king and the sun symbolizing the positive Sulfur principle, the queen and the moon the negative Mercury principle. The still and the furnace indicate something of the devices by which the marriage is accomplished. The goose in the background also represents a retort otherwise known as a "goose-neck."

Figure III (5) is a picture of the laboratory of an alchemist, of the place where the two contraries, represented by the sun and the moon looking in at the window, interact or combine to form the Philosopher's Stone or Azoth (6) which is represented by the symbol of the planet Mercury. That symbol being above the two plants growing from the same root, or from the same pot, further confirms the idea of the union of the opposites, as does also the lion who is swallowing the serpent.

The alchemists' habits of using the same term, whether a word or a symbol, in more than one sense, and of using a wide variety of names to designate the same thing, have made their meaning more difficult to discover. In their writings the name and the symbol of the sun mean sometimes the metal, gold, and sometimes the positive or Sulfur principle. The latter is also represented by the symbol of sulfur and by many different names. The name and the symbol of the moon represent sometimes the metal, silver, sometimes the negative or Mercury principle —

(4) *Basilii Valentini Practica de Magno Lapide Antiquorum Sapientium* in *Museum Hermeticum Reformatum*, etc., p. 405.

(5) *Museum Hermeticum*, etc., p. 422. These same pictures, also from copper plates, are printed reversed or in their mirror images in *Les Douze Clefs de Philosophie de Frère* BASILE VALENTIN, Paris, 1659. The woodcuts in the German edition, *Von dem grossen Stein der uhralten Weisen*, Hamburg, 1700, are much cruder but embody the same symbolism.

(6) The words, "or Azoth", *Isis*, *25*, 340 (1936), line 13, ought to be deleted.

and the latter is also represented by the symbol of the planet, Mercury, which symbol at other times represents the Azoth or Philosopher's Stone. This last moreover, which contains within itself the proper proportion of the Sulfur principle, is called sometimes simply Mercury, sometimes the Sophic Mercury or the Mercury of the Philosophers. The following passages from *Le Texte d'Alchymie* are illuminating in this connection; they expound the theory of alchemy and supply us with lists of synonymous terms.

Therefore, my child, you see very well that I have declared all to you when I have made you understand in what manner our Sulfur is contained in the belly of the Mercury, and that it is correct to call it internal Sulfur or hidden Spirit, which is no other thing than heat and dryness, acting on the cold and the moisture, acting on the patient, the pure mercurial substance of which the Sulfur is the soul, since it is it which vivifies and sustains the Mercury which would be, without our Sulfur, only a dead, unfruitful, and sterile earth. There is then good reason to say that Sulfur and Mercury are the proper and true substances of the metals. But we do not say that the Sulfur and the Mercury are the true substances of the metals, because it is very certain that this Sulfur cannot be without Mercury and that our Mercury cannot be without this Sulfur which is intimately united and incorporated with it, as the soul is with the body.

These two names of Mercury and of Sulfur are only names for one single substance which we know under the names of Quicksilver or Mercury.....(7)

Therefore make manifest that which is hidden and make occult that which is manifest. I tell you, in that alone consists the work of the sages. Our gum curdles our milk, and our milk dissolves our gum, and they grow in the Stone of Paradise, which Stone is of two contrary natures, that is to say, of the natures of Fire and of Water.

All that I have written above ought to have opened your understanding to the intelligence of the philosophers — for I have explained to you altogether well and have given you to understand what our Sulfur is, that the philosophers have also called Gum, Oil, Sun, Fixity, Red Stone, Curd, Safran, Poppy, Red Brass, Tincture, Dry, Fire, Spirit, Agent, Soul, Blood, Burned Brass, Red Man, and Quick Earth. I have also given you a clear and concise explanation of that which the philosophers name Water, Milk, White Wrapper, White Manna, White Urine, Cold, Moisture which does not dampen, Body, Womb, Moon, White Woman, Changing Habit, volatile, patient, Virginal Milk, Lead, Glass, White Flower, Flower of Salt, Fleece, Veil, Venom, Alum, Vitriol, Air, Wind, Rainbow, Naked Woman, and so many other names, which are only for the purpose of making us conceive the qualities, properties, and the two natures of male and female contained in our substance, which is nothing else but animated Quicksilver. It is this viscous moisture mixed with its earthy part, our Mercury, and the true foundation of all our science.

It is in this great number of terms that the wise men have taken pleasure in writing their sentiment relative to our science. All these names ought to convince

(7) *Le Texte d'Alchymie et le Songe-Verd*, Paris, 1695, pp. 87-88.

you of the truth of our science, for all of them have only one meaning and all of them have for their purpose only to expose the hermaphroditic Mercury to us. It is feminine if it is considered as separated from the Sulfur which it contains within it and of which it is the substance; but it is masculine if it is considered according to its Sulfur with which it is united so intimately that it cannot be separated from it; and it can be said of their marriage that they are both of them in the same flesh (8).

In Figure IV (9) the Philosopher's Stone is represented as arising out of the interaction of the Soul, the positive principle symbolized by the Red Lion, and the Body, the negative or material principle symbolized by the Gluten of the Eagle. The seven steps in the alchemical process are enumerated.

The preparation of the Philosopher's Stone as described by the author of the *Speculum Alchemiae* which is ascribed to ROGER BACON, is carried out by heating the two principles together, Sulfur and Mercury, in a tightly closed vessel from which no vapors may escape; the vessel is so arranged that the heat reverberates around it; and the heating at first is with a slow fire which "is to be augmented and made stronger gradually and in successive stages during the course of the work." (10) The fact that the Chinese alchemist, WEI PO-YANG (12567, 9340, 12883), (11) more than a thousand years earlier, described the same process for the preparation of the pill of immortality (which pill was at once real gold artificially prepared and the medicine by which base metals might be converted into gold and silver) (12) is one of the considerations which indicate the essential identity of Chinese and European alchemical theory and support the belief that the alchemy of Europe derived from that of China. For the Chinese the positive principle, *Yang* (12883), the Dragon, was associated with the sun and with fire; it was active, hot, dry, light, and spiritual. The negative principle, *Yin* (13224), the Tiger, was associated with the moon and with water; it was passive, cold

(8) *Ibid.*, pp. 90-92.

(9) *Catholicon Physicorum seu Modus Conficiendi Tinctarum Physicam et Alchymicam*, etc., by SAMUEL NORTON of Bristol, Frankfurt, 1630.

(10) *Isis*, 18, 276-277 (1932).

(11) The numbers printed after Chinese words at the point of their first occurence are the numbers by which the Chinese ideographs are designated in GILES' *Chinese-English Dictionary* (2nd. ed., London, 1912). They thus identify the words and distinguish them from others of the same romanization.

(12) *Proc. Amer. Acad. Arts and Sciences*, 70, 231 ff. (1935).

wet, heavy, dark, and material. As WEI PO-YANG described the process, *Yin* and *Yang*, the Tiger and the Dragon, are heated together in a vessel which is "closed on all sides"; "the escape must be firmly blocked"; and "the flame at the start should be weak, so as to the controllable, and should be made strong at the end." (13) In his description of the process he uses a number of terms, Blue Dragon, Grey Dragon, White Tiger, Scarlet Bird, which begin to become somewhat intelligible if compared with the equally strange terms which occur in the above-quoted passages from *Le Texte d'Alchymie*.

Further confirmation of the identity of Chinese and European alchemical theory is now found in old Chinese pictures which represent symbolically what is obviously the same theory as the European pictures which we have been discussing. We have found the pictures in a treatise entitled *Chin Tan Ta Yao* (2032, 10618, 10470, 12889) (Essentials of the Gold Medicine) written by CH'ÊN KUAN-WU (658, 6363, 12.700) or SHANG-YANG-TZŬ (9729, 12883, 12317) during the reign of the YÜAN (13744) Emperor WEN-TI (12633, 10942) (1329-1332 A. D.). Our edition is the MING (7946) edition in which the *Chin Tan Ta Yao* occupies the first five volumes of a twenty-four volume collection of works on alchemy, *Chin Tan Chêng Li Ta Ch'üan* (2032, 10618, 687, 6879, 3176) (Comprehensive Account of the Gold Medicine), printed during the reign of the MING Emperor YING TSUNG (13308, 11976) with the reign title *Chêng T'ung* (687, 12316) (1436-1450 A.D.). TS'AO (11636) (14), reproduces pictures of apparatus from the *Chin Tan Ta Yao* in an article on Chinese alchemical equipment and methods, and says of the book that it is common in the libraries of China and is of both theoretical and practical interest. For the translations which appear in the present article, for explanations of Chinese terms, and for critical reading of the manuscript I am grateful to Mr. MA CHUK-CHING (7576, 2616, 608) and Mr. SU GOUQ-JEN (10320, 6609, 608), (15)

(13) *Isis*, 18, 250 ff. (1932); 25, 339-340 (1936).

(14) Y.Y. TS'AO, "The Equipment and Methods of the Ancient Chinese Alchemists" (in Chinese), *Science* (Science Soc. of China, Shanghai), 17, 31-54 (1933). WILLIAM H. BARNES, "Diagrams of Chinese Alchemical Apparatus", *Jour. Chem. Education*, 13, 453-47 (1936).

(15) Family names first. Spellings not according to GILES.

graduate students at the Massachusetts Institute of Technology.

The *Chin Tan Ta Yao* contains a picture entitled "The Interaction of the Figure and the Thing" in which *Yin* is represented by the woman, by the Tiger, and by water in the forms of clouds, rain, and hail; *Yang* by the man, by the dragon, and by fire. The tortoise and the serpent, symbolizing the material embodiments of the *Yang* and *Yin* principles, further represent the combination of the two contraries. Both the *Yin* and *Yang* forms and the *Yin* and *Yang* substances are necessary for the successful preparation of the medicine, as the text which accompanies the picture makes clear.

> LAO CHÜN (6783, 3269) said : "Look inward at the heart; there is no heart. Look outward at the figure; there is no figure. Look farther into the thing; there is nothing. Understanding these, one sees the Void only."
>
> BUDDHA said : "There is one precious thing hidden in the universe." He also said : "I have a thing which fills all the space between the heaven and the earth. Do you know it?"
>
> The book of Change says : "The *Tao* (10780) is the metaphysical thing." It also says : "The interactions of male and female, the offspring of all things, the practice of the three religions, all these cannot be separated from the figure and the thing."
>
> Accordingly TAN-YANG (10618, 12883) said that we should overcome the crowd and the many dragons and tigers as quickly as possible.
>
> PO-YANG (9340, 12883) said : "Close the ears, the eyes, and the mouth, and make no communication. The true man comports himself as if he were in deep water where he floats and sinks with the current." If we comprehend all these things, we shall then know that there exist in the Body the figures, Dragon and Tiger, and the things, Tortoise and Serpent. Without these two, there will be no embryo ever formed. Never neglect this most important and most precious precept.

The page of the *Chin Tan Ta Yao* which is reproduced in Figure VI is a table of contraries, the entities and qualities named on the left-hand half of the page (where the tiger is pictured) being negative, those on the right-hand (where the dragon is pictured) being positive. The things named in the lower half of the diagram in the column headed *Hard* (first to the left of the center of the page) are opposite each for each to those which are named in the column headed *Soft* (first to the right of the center). And so for the other columns reading left and right from the center. The table supplies us with many synonymous names for *Yin* and *Yang*, with names which are not unlike those which we have seen the European alchemists using, with names

which we may expect to find the Chinese alchemists employing to designate the prime materials out of which the pill of immortality is to be produced. The diagram then will help us toward a better understanding of Chinese alchemical writings.

Since the table is entitled "A Diagram of the Medicine Laboratory of TZŬ-YANG" (12329, 12883), it seems perfectly evident that the laboratory is the place where the contraries are brought together—and that is the theory of the preparation of the pill of immortality.

The terms, Golden *Wu* (12721) and Jade Cabbit, are especially interesting. According to ancient Chinese legend the Golden *Wu* or three-legged crow lives on the sun and the Jade Rabbit in the moon. The terms, understood poetically, may properly be translated *sun* and *moon* respectively, but it has seemed better for the present purpose to set down their literal meanings. The expectation that the Golden *Wu* and the Jade Rabbit would figure in alchemical discussions has been happily fulfilled by our finding in the version of the *Ts'an T'ung Ch'i* (11548, 12669, 1053) of WEI PO-YANG (16) which is included with the commentaries of P'ÊNG HSIAO (8887, 4313) or CHEN-I-TZŬ (607, 5342, 12317) in the MING collection, *Chin Tan Chêng Li Ta Ch'üan*, (17) the pictures which are reproduced in Figures VIII and IX. The pictures pertain to the commentary which explains them as follows.

> The Sun is *Yang*, but within the *Yang* there is always some *Yin* — just as vermilion always contains some actual mercury. If the *Yang* is without *Yin*, then the spirit cannot express itself. The *Yang* which contains some *Yin* is called Female Fire. The inside of the Sun has the Golden *Wu* in its southern part — and this is the Fire Woman.
>
> The Moon is *Yin*, but within the *Yin* there is always some *Yang* — just as lead always contains some actual silver. If the *Yin* is without *Yang*, then the spirit cannot express itself. The *Yin* which contains some *Yang* is called Male Gold. The inside of the Moon has the Jade Rabbit in its northern part — and this is the Water Man.

The alchemists, Chinese and European alike, were attempting by chemical methods to prepare the elixir and to produce real

(16) Cf. *Isis*, 18, 210-289 (1932).

(17) Texts of the TS'AN T'UNG CH'I with commentaries by CH'ÊN HSIEN WEI (658, 4523, 12586) or PAO-I-TZŬ (8709, 5342, 13217), and by CH'ÊN KUAN-WU or SHANG-YANG-TZŬ are also included.

gold by bringing about the proper combination of the two principles which they considered to be the fundamental basis of all material things. We now believe that their notion of the ultimate principles, while possibly right in some respects from a point of view which is still metaphysically tenable, was certainly wrong in so far as they supposed that the principles could be isolated, manipulated, or in any way modified, or impelled by chemical means. The ultimate principles, as we now believe them to be, are material or pseudo-material entities which with equal propriety may be regarded as matter or as energy, things whose properties give rise to the phenomena of chemistry but are themselves affected only by the tremendous forces of electricity and radiation which have recently become available to us.

The alchemists did not succeed in producing gold or the Grand Elixir, but they did discover many new facts and useful compounds, and did lay much of the foundation upon which the science of chemistry has been erected. "We are exceedingly obliged to them", writes BOERHAAVE, "for the immense pains they have been at, in discovering, and handing to us, so many difficult physical truths : Insomuch, that Lord BACON justly compares them to a father, who on his death-bed inform'd his lazy sons, of a sum of money which he had hid under ground in his garden. After his death they went to digging, in hopes of finding the treasure, and tho' they missed their aim, for in reality there was none hid, yet they sufficiently enrich'd themselves, by the large crop which the ground, in consequence of this tillage, produced. Thus much I have long ago had a mind to say, concerning the knowledge of the true alchemists in physics; lest such skillful artists should be condemn'd by incompetent judges." (18).

Massachusetts Institute of Technology,
Cambridge, Massachusetts. TENNEY L. DAVIS.

(18) BOERHAAVE's "New Method of Chemistry", etc., 3rd. ed., London, 1-53. page 203.

Carnegie Institution of Washington. Division of historical research. Section of the history of science.

Nineteenth annual report for the period extending from July 1, 1936 to June 30, 1937 (Previous reports appeared in *Year Books* of the Carnegie Institution, no. 18 to 35, 1919 to 1937; the 12th and following also appeared in *Isis*, the latest in vol. 26, 139-46, 1936).

I. *Introduction to the History of Science.* — In spite of many interruptions (1) the preparation of volume III dealing with 'Science and learning in the XIVth century' has advanced considerably during the last year. It is hoped that the Latin and European part (by far the largest one) will be completed befor the end of 1937. The very important Jewish part is already completed. When the Latin part is ready, it will then suffice to revise the Byzantine, Arabic and other oriental notes. The Chinese and Japanese notes will cause special difficulties as no collaborator has yet been found able and willing to revise them. It should be remembered that all the notes not only for the fourteenth century but also for the fifteenth century have been ready for many years, but they are gradually rewritten on a larger scale, all the facts being reinvestigated far more deeply than could be done the first time.

The preceding remarks refer only to the analytical stage of the work. According to SARTON's method no attempt of synthesis will be made until after the analysis of all the materials has been perfected in every possible way.

(1) The main interruption was due to Dr. SARTON's illness or rather accumulated tiredness. Upon medical orders he sailed from Boston on Dec. 5 on the SS. Lady Drake for a cruise to Demerara and back; he was back in his office on Jan. 4.

Dr. WELBORN has devoted most of her time to the revision and amplification of the Latin notes.

II. *Maya Astronomy.** — The astronomical table preserved on pages 51 to 58 of the Dresden Codex may be considered as consisting of two sets of data : first, of a table of eclipse syzygies; second, of a group of ten "pictures." The hypothesis that the "pictures" referred to lunar — and not to solar — eclipses actually observed in the Maya territory, has yielded an unexpectedly large number of theoretically possible correlations mentioned in the previous report. A study of the table of syzygies proper, i.e., of the numbers and dates which form the calendarial framework for the "pictures", has led to some interesting results. It has been found that the empirical data — the dates of actually observed lunar eclipses, and the intervals and combinations of intervals between these dates — which are necessary for the construction of a Maya table of syzygies, could have been collected in a very short time. A list of all the lunar eclipses which could have been observed, within the limits of the Maya territory, during one third of a century — the approximate duration of the Maya eclipse cycle of 11960 days, or the average useful life of a priest-astronomer, — would furnish enough data for the construction of an almost complete framework of intervals showing all the essential features of a Maya table of eclipse syzygies. The hypothesis that the tabular framework, like the "pictures", is based on lunar — and not on solar — eclipses actually observed by the Maya, is simpler than the assumption that the Maya were not interested in lunar eclipses and that they have spent many centuries in accumulating solar eclipse data for their table of syzygies; incidentally, a table of the Dresden Codex type could have been constructed by astronomers whose knowledge of the length of the synodical and of the nodical months and whose ability to handle fractions may be assumed to have been rather limited. The omission, in the Maya table of eclipse syzygies, of a number of theoretically possible syzygies may lead to the determination of the empirical set or sets of data used in the construction of the table, thus giving us a terminus post quem for the origin of the Dresden Codex

(*) This chapter is contributed by Dr. A. POGO.

table, and an additional criterion for the elimination of some of the correlation possibilities offered by the "picture" intervals.

While the solution of the elusive correlation problem remained the main purpose of the Dresden Codex studies, an investigation of the Supplementary Series in general, and of the lunar calendar of the Maya in particular, was carried on from a new point of view — as a Maya contribution to comparative calendariography. The Maya equivalents or analogies of such chronological devices as the Roman Indiction, the Epact, the Golden Number, etc., appear, in the light of this investigation, as gradual discoveries, made by various Maya astronomers, of chronologically useful or of merely curious properties which were inherent in their calendar system. A deeper insight into the development and the structure of the Maya calendar may be useful to workers on the correlation problem.

III. *Other investigations.* — Dr. SARTON's teaching in Harvard University, especially the direction of his seminary and his guidance of special students, oblige him to devote a part of his time to investigation of various topics of the history of science far remote from the fourteenth century. The range and diversity of these investigations is apparent from the list of his writings; it is not necessary to insist upon it, but it is worth while to remark that though much time is thus taken from the main work, that time is far from lost even from the point of view of that work. A historian of science whose knowledge would be restricted to the fourteenth century would be a very poor historian of that century indeed.

IV. *Editing of Isis and Osiris.* — Many correlated activities are involved by the editing of *Isis* and *Osiris*, and the publication in *Isis* of a critical bibliography of all the writings anent the history and philosophy of science. As far as the Carnegie Institution is more immediately concerned, these writings can be divided into three groups, dealing respectively (a) with the period extending from the time of HOMER to that of ROGER BACON, (b) with the fourteenth century, (c) with later centuries. The notes of group (a) are in the form of errata and addenda to vols. I and II of the *Introduction*; those of group (b) are materials for

volume III (generally used by the author in advance of their publication in *Isis*); those of group (c) are materials for the subsequent volumes.

During the year 1936-37, four numbers of *Isis* were published (70 to 73), forming vol. 26 and halves of vols. 25 and 27, plus one volume (vol. II) of *Osiris*, devoted to the longer memoirs. A total of 1697 pages, 25 plates, 88 figures and facsimiles, containing 61 memoirs, 38 shorter notes, 103 reviews, and 2070 bibliographical items. No other reviews in the world perform a similar service with the same completeness and the same catholicity. *Isis* is not simply a vehicle for new facts and new ideas in its field, but also a clearing house and center of information for every fact and idea concerning the history of science, wherever it may be published and in whatever language. Thus it is at one and the same time the best tool for any student engaged in these studies, and the best means of establishing them as an independent discipline on as high a level of scholarship as possible.

V. *Lectures*. — Dr. SARTON gave a course of thirty-three lectures on the history of modern (i.e., post-Newtonian) science at Harvard University and also at Radcliffe College. He conducted a seminary on the history of science which was attended by members of Harvard University, Radcliffe College, and of the Massachusetts Institute of Technology (see *Isis* 26, 154; 28, 95-96).

BIBLIOGRAPHY

POGO, ALEXANDER. Egyptian water clocks. *Isis*, vol. 25, 403-425, 4 pl., 6 figs. (1936).

— The lunar saros series of the Columbus eclipse of 1504 February 29 — March 1. *Pop. Astron.*, vol. 44, 353-363, 2 figs. (1936).

— The lunar appulse of 1936 December 28. *Pop. Astron.*, vol. 44, 481-483, 2 figs. (1936).

— KIRCHER, not NARDI. (Answer to Query 56). *Isis*, vol. 26, 150-151 (1936).

— IOANNES NARDIUS. *Isis*, vol. 26, 326-329 (1937).

— On the visibility of lunar appulses. *Pop. Astron.*, vol. 45, 126-129, 2 figs. (1937).

— The lunar appulse of 1937 May 25. *Publ. Astr. Soc. Pacific*, vol. 49, 98-100, 1 fig. (1937).

SARTON, GEORGE. The unity and diversity of the Mediterranean world. *Osiris* 2, part 9, 406-63, 1936.
— A Hindu decimal ruler of the third millennium. *Isis* 25, 323-26, 1 map, 1936.
— On a curious subdivision of the Egyptian cubit. *Isis* 25, 399-402, 1 fig., 1936.
— Early editions of the *Deutsche Sphaera* of CONRAD OF MEGENBERG (Q. 63). *Isis* 25, 455, 1936.
— IBN SHABBATH, a XIIIth century engineer (Q. 64). *Isis* 25, 455, 1936.
— Remarks concerning the history of XXth century science. *Isis* 26, 53-62, 1936.
— Third note on date culture in ancient Babylonia. *Isis* 26, 95-8, 1936.
— Notes on the history of anagrammatism. *Isis* 26, 132-38, 3 fig., 1936.
— Forty-sixth critical bibliography of the history and philosophy of science and of the history of civilization (to end of February 1936, with special reference to China and Japan). *Isis* 25, 522-613, 1936.
— Forty-seventh critical bibliography of the history and philosophy of science and of the history of civilization (to end of April 1936, with special reference to Israel). *Isis* 26, 244-98, 1936.
— Appel pour l'achèvement du *Système du monde* de DUHEM. *Isis* 26, 302-03, 1937 (avec Mme. P. TANNERY).
— A Hindu decimal ruler of the third millennium (Second note) with 1 fig. *Isis* 26, 304-05, 1937.
— DARWIN's conception of the theory of natural selection. After an unpublished letter of 1861. *Isis* 26, 336-40, 1 facs., 1937.
— The discovery of X-rays. With a facsimile reproduction (no. XVIII) of RÖNTGEN's first account of them published early in 1896. *Isis* 26, 349-69, 1937.
— The earliest representations of the remains of prehistoric pile-dwellings apropos of CONRAD WITZ's painting of 1444. (Q. 65). *Isis* 26, 449-51, 1 pl., 1937.
— A seventeenth century Malay dictionary. (Q. 68). *Isis* 26, 451, 1937.
— Forty-eighth critical bibliography of the history and philosophy of science and of the history of civilization (to end of September 1936, with special reference to Iran and Islam). *Isis* 26, 490-604, 1937.
— Materials for the history of the history of science. *Isis* 26, 6-9, 1937.
— Forty-ninth critical bibliography of the history and philosophy of science and of the history of civilization (to end of December 1936, with special reference to sections 15 to 19). *Isis* 27, 117-200, 1937.
— Bibliography of Arabic publications of CORNELIUS V. A. VAN DYCK (1818-95). *Isis* 27, 36-7, 40-5, 12 facs., 1937.

Notes and Correspondence

Answer to Query 62.—JOANNES GAZULUS (*Isis* 25, 454). Dans le livre de J. G. DOPPELMAYER : *Historische Nachricht von den Nürnbergischen Mathematicis* (Nürnberg 1730, p. 19) j'ai trouvé ce qui suit :

„De distinctione Domorum coeli contra CAMPANUM et JOANNEM GAZULUM, Ragusinum, cujus et alia de horis temporalibus decreta ibidem retractantur". DOPPELMAYR dit à propos de cet ouvrage : „Nachdem REGIOMONTANUS die Einteilung der 12. himmlischen Häuser nach einem bessern Methodo, den er rationalem benennet, als die alten Astrologi, angeordnet, hat er in specie wider zwey derer vornehmsten, als wider JOH. CAMPANUM, der nach A.C. 1100 gelebet, und wider JOH. GAZULUM von Ragusa, der einige Zeit zuvor, ehe REGIOMONTANUS nach Italien kame, die Astrologie zu befördern getrachtet, ein Scriptum ergehen lassen, und in solchem ihre Methode, auch anderes, was die Einteilung derer Stunden angehet, verworfen, davon auch nichts zum Vorschein gekommen. Diesen Abgang hat nach deme JOH. SCHONERUS, in denen A. 1536 von ihme vermehrt edirten Tabb. resolutis wieder ersetzet, als er in selbigen wegen dieses Methodi eine gründliche Defension vor REGIOMONTANUM nicht so wohl wider jene alte, als auch verschiedene neue Astrologos beygebracht." Aux pp. 48-49 du même ouvrage nous lisons que les Tabulae resolutae de SCHONER ont été rééditées à Nuremberg en 1562 dans les „Opera mathematica" de cet auteur, ainsi qu'en 1582 à Wittemberg (in 4to).

(*Moscou*) V. ZOUBOV.

Answer 2 to Query no. 63.—*Early editions of the Deutsche Sphaera of Conrad of Megenberg* (*Isis* 25, 455; 27, 324-5).

Ayant eu l'occasion de consulter dernièrement le livre de JOHANN GABRIEL DOPPELMAYR *„Historische Nachricht von den Nürnbergischen Mathematicis und Künstlern"*, Nürnberg 1730, j'ai trouvé au pages 44-45 quelques indications concernant CONRAD HEINFOGEL et sa traduction de la „Sphère" de SACROBOSCO. Je ne puis ne pas attirer votre attention sur ces indications, fort incomplètes du reste et évidemment erronées en plusieurs points.

Voici ce qu'écrit DOPPELMAYR : „A. 1516 gabe er des JOHANNIS DE

SACROBOSCO doctrinam sphaericam nach seiner Uebersetzung in das Teutsche vor diejenige, welche der lateinischen Sprach nicht kündig, zu Nürnberg in 4to an das Liecht... Bey dieser Uebersetzung ist zu bemerken, dass der Auctor sich absonderlich bemühet, alle vorkommende Terminos technicos auch in teutscher Sprach zu geben, und z. E. den Horizont den Augenender, den Aequatorem den Ebennächter, den Meridianum den Mittentager-Creis, den Zodiacum den Thier- oder Zeichen-Trager, die Coluros die Wald-Ochsen-Creise, die Tropicos die Wiederkehrer etc. etc. benennet, welche dem Leser, biss er solche neue Teutsche Nomenclaturen sich wohl imprimiert viele Hindernis im durchgehen verursachen.

Diese Teutsche Version ist wieder An. 1519 zu Cöln und dann A. 1533 zu Strassburg in 4to und zwar unter diesem Titul ediret worden : Sphaera materialis geteutscht durch Meyster CONRAD HEINFOGEL von Nürnberg ein Anfang und Fundament vor die, die Lust haben zu der Kunst der Astronomy".

Ainsi donc les „termini technici" de HEINFOGEL sont les mêmes que ceux de KONRAD VON MEGENBERG. C'est tout ce que je puis vous communiquer, — bien peu, comme vous le voyez.

(*Moscou*) V. ZOUBOV.

Question no. 72.—*Les sources de Leon Batista Alberti* (1404-72) *dans son traité* : *De re aedificatoria* (q. v. *Isis* 26, 158-59).

Je voudrais poser une question que je n'ai pu résoudre dans mon commentaire sur le traité de L. B. ALBERTI *De re aedificatoria*. ALBERTI y cite à plusieurs reprises les « Problèmes » de pseudo-ARISTOTE. Deux fois il accompagne ces citations par des remarques, puisées à une source inconnue. A la page m ii verso de l'édition 1485 (l. V, ch. 17 des éditions de 1512 et 1541) ALBERTI déclare : « Aiebat ARISTOTELES carnium soliditatem in animante constare a frigore » (cf. pseudo-ARISTOTE, *Problemata*, sect. VII, 14 d'après l'édit. des « Opera » d'Aristote vol. VI), et il ajoute : « Et notarunt qui ista profitentur fabros qui officinis ignariis exerceantur ferme omnes vultu et cute admodum rugosa et crispa reddi » etc. De même on lit à la page & iiii (l. X, ch. 6 de l'édition de 1541) : « Aquae puteorum, inquit ARISTOTELES, aestate post meridiem fiunt tepidae. » (cf. pseudo-ARISTOTE, *Probl.*, sect. XXIV, 2) et immédiatement après : « Sunt qui asseverant aquas puteorum aestate non esse sed videri comparatione ferventis aeris gelidas. Tum contra multorum inveteratam opinionem experiri licet haustas nuperrime nequaquam irrorare : si id quo exceptae sint vitrum satis tersum et sucidiore (sudore?) non perunctum sit ». (Je cite pseudo-ARISTOTE d'après l'édition des « Opera » d'ARISTOTE, vol. IV, Paris, DIDOT, 1878). Ma question se réduit à ceci :

ALBERTI n'avait-il pas sous les yeux la traduction latine des « Problèmes » commentée par PIETRO D'ABANO ? (Imprimée à Mantoue, 1475, à Padoue, 1482, et à Venise, 1501 et 1520). S'il en était ainsi, ce serait un exemple de plus d'emprunts faits à des auteurs, qu'ALBERTI ne voulut jamais nommer au cours de son ouvrage, tels que LACTANCE, MACROBE, CASSIODORE, PROCOPE et autres.

(*Moscou*) V. ZOUBOV.

Neuvième centenaire d'Ibn Sina.—Nous recevons la lettre suivante portant l'en-tête « Türk tarih kurumu. Ibni Sina komitesi » et datée Istambul le 18 mars 1937.

« Cher Professeur, la commémoration du 900ième anniversaire du grand médecin et savant turc IBN SINA sera célébrée à Istambul le 21 Juin 1937. Un livre contenant sa biographie ainsi que ses œuvres et sa bibliographie sera publié à cette occasion. La Société d'Histoire Turque ainsi que l'Institut d'Histoire de la Médecine à l'Université d'Istambul connaissant votre intérêt à ce sujet vous font part de cette manifestation scientifique et vous prient de bien vouloir agréer leurs respectueux hommages.

Le Président du comité d'IBN SINA
Député de Sivas et Professeur à la Faculté de Lettres,

Ş. GÜNALTAY.
SÜHEYL ÜNVER.

A facet from the life of Newton.—In the year 1676 there was published in London a book with the poetic title of *Musick's Monument*. The purpose of its author, THOMAS MACE, was to instruct his contemporaries in playing the viol and lute, and, in particular, to improve the singing of Psalms in religious services. There is, he says on the title-page, "*a Necessity of Singing Psalms Well, in...Churches*, or not to *Sing* at all ". His admirable work, excellently printed and replete with charts and illustrations, could not hope for commercial success. So it was that MACE turned for assistance to "Divers Honourable, Reverend... and very Worhty Persons", each of whom purchased one copy at the not inconsiderable price of twelve shillings. Among these sympathetic sybscribers were three important leaders in the English scientific and philosophical renaissance, ISAAC BARROW, HENRY MORE, and ISAAC NEWTON (1). At a time when his moderate income was no more than adequate for his personal and scientific needs, and twelve shillings plus

(1) Sig. c^v ff., "The Subscribers Names".

one represented the quarterly dues of the Royal Society, the kind assistance which NEWTON gave to THOMAS MACE and *Musick's Monument* is a further example of the generosity and broad interests of England's great scientist.

Smith College, Northampton, Mass. GRANT MCCOLLEY

Jean Stas (Louvain 1813-Bruxelles 1891). — M. JEAN PELSENEER a publié récemment un « Catalogue sommaire des MSS. du fond Stas de l'Université libre de Bruxelles » (*Bulletin de la Société chimique de Belgique*, t. 46, 10 p., 1937). Ce catalogue se termine par l'appel suivant :

« On se propose de constituer à la Salle JEAN STAS de l'Université libre de Bruxelles, un centre de documentation relatif au grand savant. C'est dans le but d'aider à la réalisation de ce dessein que nous prenons la liberté d'adresser un pressant appel à la bonne volonté des personnes et institutions en possession de documents, quels qu'ils soient, intéressant STAS et ses correspondants. Prière d'envoyer toutes les informations à M. JEAN TIMMERMANS, professeur à la Faculté des Sciences, Université libre de Bruxelles, 50, Avenue des Nations, Bruxelles. »

Ajoutons que l'on trouvera des notices biographiques de l'illustre chimiste dans l'*Annuaire de l'Académie royale de Belgique*, 1892, et dans la *Biographie nationale de Belgique*, t. 22, 654-684, 1920, toutes deux rédigées par W. SPRING.

G. S.

Harvard University.—Seminary on the History of Science and Learning, 2nd year (1936-37).—An account of the activities of this Seminary during the first year (1935-36) will be found in *Isis* 26, 154-55.

The meetings of the second year took place at 3:30 P.M. in room C (top floor of Widener Library), as follows :

1. October	16	Dr. SARTON : The meaning of our studies. Their scientific and social purpose.
2.	23	Dr. SARTON : The study of the history of science.
3.	30	„ :
4. November	6	Prof. HARTNER : Fundamental problems of chronology.
5. „	13	Dr. SARTON : Social aspects of science.
6. „	20	„ : The study of the history of physics.
7. December	4	„ :
8. January	8	„ : AUGUSTE COMTE.
9. „	15	„ : The study of contemporary science.
10. „	22	Prof. A. O. LOVEJOY (Johns Hopkins) : The history of ideas and the history of science.

11. January	29	Dr. SARTON: Organization of an Institute for the History of Science.
12. February	5	Prof. R. C. ARCHIBALD (Brown University): Babylonian mathematics.
13. „	16	Dr. SARTON: DARWIN.
14. „	23	Prof. D. J. STRUIK (M. I. T.): Attempts in the eighteenth century to establish the calculus on a sound basis.
15. March	2	J. G. CROWTHER (Scientific correspondent of the *Manchester Guardian*): The relation of BENJAMIN FRANKLIN's discoveries to the conditions of his time.
16. „	9	J. G. CROWTHER: JOSIAH WILLARD GIBBS. N.B. Meetings 15 and 16 were not really seminary meetings, but general lectures open to the public, delivered in Hunt Hall. The seminary was adjourned on those two days in order to enable its members to attend Mr. CROWTHER's lectures.
17. „	16	Dr. SARTON: DANTE, PETRARCA and BOCCACCIO.
18. „	23	Dr. D. B. DURAND: Humanism in the fifteenth century.
19. „	30	Prof. HARTNER: Evolution of the zodiac.
20. April	13	Prof. T. L. DAVIS (M. I. T.): The theory of alchemy with special reference to alchemical illustrations.
21. „	20	I. BERNARD COHEN: The meaning of simultaneous discoveries.
22. „	27	AYDIN SAYILI: The domestication of plants and animals.
23. May	4	A. R. GOLDSMITH: Scientific academies from the XVIth century to the end of the XVIIIth century

The Unity History Schools.—The "Unity History Schools" initiated and led by FRANCIS SYDNEY MARVIN have often been referred to in *Isis* (see, e.g., 6, 119-21; 22, 531).

The idea of these schools was first mooted at a gathering of the London Adult School Union at Jordans on the 1st of August 1914. It was the day on which war was declared between Germany and Russia and the world was on the eve of the greatest cataclysm in history. Then was the time to turn one's thoughts to those greater and more permanent forces which have built up the world community of the present, imperfect as it is, but growing, as we hope, stronger in unity in spite of the most errible shock which could have been imagined.

I. Mr. MARVIN undertook to consider a plan for historical studies on the lines of Unity and Progress, and the first 'Unity History School' was held in August 1915 at Woodbrooke, the social and educational settlement of the Society of Friends, near Birmingham. The subject was *The Unity of Western Civilization*, and it gave name and colour to all which have succeeded it. The common foundations and the essentially identical spirit of the Western civilization which sprang from Greece and Rome were exhibited in their various aspects.

II. The audience of the first year were eager to continue, and in the second course, in August 1916, the conception and the fact of 'Progress' were studied, being the dynamical aspect of the static conditions of 'Unity' which was the subject of the first. The volume following this second course, called *Progress and History*, soon reached six impressions and has been used for study in various universities.

III. In August 1919 a third school was held to consider *Recent Developments in European thought*. This was an attempt to bring the more general treatment of the earlier volumes into closer touch with recent conditions. How far, it was asked, does the development of the last fifty years bear out the conclusions of the two earlier courses? The volume following this course has now reached four impressions.

IV. Before the fourth school met, the League of Nations had been adopted by the victorious Powers at Versailles and the Covenant of the League had been signed by nearly fifty nations. The course of 1920 was therefore held in conjunction with the League of Nations Union and its volume called *The evolution of world peace*.

V. The fifth course was a natural sequel to that of 1920. The Covenant of the League contains clauses instituting the 'mandatory' system under which the stronger Powers assume the responsibility of trustees towards certain weaker peoples. This suggested the problem of the relations of the West with other races and nations in various degrees of progres. This school assembled in August 1921, and the subsequent volume was *Western races and the world*.

VI. The sixth course, in 1922, treated especially of the function of Science in the development of civilization. In the volume which followed, *Science and civilization*, the history of science is sketched in broad outline and then the living problems arising from it, and the whole is looked at—as in all the other volumes—from the completely human and not merely the nationalist standpoint.

VII. The course of 1923, held in Vienna, applied the same method to Art, and a volume on *Art and civilization* appeared in January 1929.

VIII. The course of 1925, held in Bournemouth, dealt with England's

place in International History, and the volume which appeared in the same year was entitled *England and the world*.

IX-X. The course of 1929 was held at Danzig and that of 1931 at Stockholm. The lectures dealt with *The new world order*, and are published in the ninth volume of the series.

XI. The eleventh school met in Prague in August 1933 under the presidency of Dr. G. P. GOOCH and dealt with *Freedom*. Lecturers both of Czech and German nationality took part. Mr. MARVIN was detained in England on this occasion by illness.

XII. The twelfth school was held in Bath in April of 1934. It discussed some of the *Dangers to World Peace* and their remedy. Baron MEYENDORFF and Professor HERBERT DINGLE as well as Mr. MARVIN gave addresses.

XIII. The thirteenth school took place in Rome at the Easter of 1935 and was one of the most successful of the series. It was conducted in conjunction with the Rome School of the History of Science under Professor ENRIQUES and cordially welcomed by the Italian authorities. The subject of discussion was *Science in the modern world* and valuable addresses were given by Italian, French, German, and English lecturers.

XIV. The fourteenth school is now arranged for May 28-31, 1937 in Farnham Castle (Surrey), where a symposium will take place on the *Relations between science and philosophy*. This is being done with the co-operation of the Institute of Philosophy.

The following lectures are announced.

F. S. MARVIN : Science and philosophy :—the historical approach.

CHARLES SINGER : The spirit of science in history.

Miss L. S. STEBBING and A. E. HEATH : The positivist conception of science.

HERBERT DINGLE and C. R. DESCH : Does the new physics suggest a new philosophical synthesis ?

REDCLIFFE N. SALAMAN : Does the conception of life cover all phenomena ?

J. H. MUIRHEAD, Miss H. M. WODEHOUSE and Mrs. SINGER : Does ethics suggest a solution ?

The American Documentation Institute.—The American Documentation Institute has been incorporated on behalf of leading national scholarly, scientific and informational societies to develop and operate facilities that are expected to promote research and knowledge in various intellectual fields.

A first objective of the new organization will be to develop and apply the new technique of microphotography to library, scholarly, scientific and other material. It will be able to conduct scholarly publication by various methods as required by cooperating organizations.

Organized as a Delaware corporation "not for profit" but for educational, literary and scientific purposes, the new organization resulted from a meeting attended by delegates from national councils, societies, and other organizations in Washington on March 13.

The board of trustees elected consists of : Dr. ROBERT C. BINKLEY, Western Reserve University; Dr. SOLON J. BUCK, Director of Publications, National Archives; WATSON DAVIS, Director, Science Service; Dr. JAMES THAYER GEROULD, Librarian, Princeton University Library; Dr. LUDVIG HEKTOEN, Chairman, National Research Council.

Such a national organization was foreseen as an outcome of Science Service's documentation activities when they were begun in July, 1935, implemented with grants from the Chemical Foundation and conducted with the cooperation of the U. S. Naval Medical School, the U. S. Department of Agriculture Library, the Bureau of the Census, the Works Progress Administration, the Library of Congress and other agencies.

Bibliofilm Service has been conducted by Science Service in cooperation with the Library of the U. S. Department of Agriculture as a service to research workers, and auxiliary publication through microfilm has been conducted by cooperation with leading scholarly and scientific journals. Science Service's documentation activities will be transferred to the new American Documentation Institute.

April 20, 1937.

San Francisco—The Division of Medical History of the University of California Medical School, under the direction of Dean LANGLEY PORTER, arranged a series of talks on the medical history of California, with particular reference to the physicians who were instrumental in founding the University of California Medical School and those who devoted their efforts to building up the various activities of the School. The schedule follows :

March 25 Dr. HENRY HARRIS : How the site for the University of California Medical School was chosen.
March 31 Dr. E. L. GILCREEST : H. H. TOLAND.
April 7 Dr. R. T. LEGGE : ROBERT MCLEAN.
April 14 Dr. W. I. TERRY : THOMAS HUNTINGTON.
April 21 Dr. C. D. LEAKE : JAMES BLAKE.
April 28 Dr. H. C. MOFFITT : WILLIAM WATT KERR.

Editorial board of Isis. — Dr. JOHN BERTRAND DE CUSANCE MORANT SAUNDERS, M. B., Ch. B., F.R.C.S. (Edin.) was appointed, on July 16, 1937, associate editor of *Isis* for the very important department of medicine. His biography may be summarized as follows :

Born July 2, 1903, at Grahamstown, South Africa. Son of the late Colonel-Commandant F. A. SAUNDERS, F.R.C.S., of Grahamstown, South Africa and London, England, and LUCY ANDERSON SAUNDERS, née MEIKLEJOHN, daughter of the late J. D. MEIKLEJOHN, Professor of Education, University of St. Andrews, Scotland.

Education : St. Andrews' College, Rhodes University College, Grahamstown, South Africa, and University of Edinburgh, Scotland.

Degrees : M. B., Ch. B., University of Edinburgh, 1925; Fellow of the Royal College of Surgeons, Edinburgh, 1930.

Positions : Demonstrator of anatomy and lecturer in applied anatomy, University of Edinburgh. Demonstrator in physiology, University of Edinburgh. Honorary surgeon, Settler's Hospital, South Africa. Appointed assistant professor of anatomy, University of California, 1931, and Consultant at the University of California Hospital. Associate professor of anatomy, and Lecturer in medical history and bibliography, 1936; Acting chairman, Department of anatomy, University of California, 1937.

Membership in scientific societies : British Medical Association; Edinburgh medico-chirurgical society; Anatomical society of Great Britain and Ireland; Royal Society of tropical medicine. Honorary member, Hollywood Academy of medicine.

Reviews

Richard C. Holcomb.—*Who gave the world syphilis? The Haitian myth.* With an Introduction by C. S. BUTLER. pp. 189. New York : Froben Press, 1937. ($3.00).

The tradition that syphilis in Europe had its origin in Haiti, and that it was imported with the return of COLUMBUS in 1493 from his first voyage, is the "myth" which Dr. HOLCOMB, after having carefully examined the evidence, is quietly determined to destroy. Where, in this connection, SUDHOFF was able to cast a doubt, HOLCOMB has completely succeeded in proving the case against the Haitian myth. Curiously enough, this feat has proven to be far from difficult; practically all that it entailed was an examination of the original sources ! Strange how first hand evidence has a way of contraverting second hand authority !

The evidence for the Haitian origin of European syphilis rests chiefly upon the testimony of RUIZ DIAZ DE ISLA (1467?-1542?) as it may be read in his work *Tractado contra el Mal Serpentino*, Seville, 1539. This work is generally assumed to have been written between 1510 and 1520, but HOLCOMB is able to prove that it was written considerably later.

The fact that most of the writers on the subject of DE ISLA's testimony have never actually seen either the manuscript of his book (National Library, Madrid, Codex P. 42), or the rare printed work, has led to the perpetuation of a number of serious errors which HOLCOMB, who has made a careful study of the first printed edition (the copy in the Henry E. Huntington Library, San Marino, California), is able to correct.

According to DE ISLA's own testimony he began to prepare his book about the year 1528, i. e. 35 years following the return of COLUMBUS from his first voyage. This should give those who have indirectly relied upon DE ISLA's oblique authority furiously to think. There are, however, more important facts than this which prove fairly conclusively that DE ISLA as an authority on the origin of European syphilis is quite untrustworthy. HOLCOMB makes out a very good case to show that DE ISLA's original authority for the Haitian origin of syphilis in Europe was most probably GONZALO FERNANDEZ DE OVIEDO Y VALDEZ's *Sumario de la Historia Natural y General de las Indias*, Toledo, 1526, and the *Historia Natural y General de las Indias, y Tierra Firme del Mar Oceano*,

Seville, 1535. DE ISLA, it would appear, merely guessed from these works that the serpentine disease must have come from the Indies.

There is a great deal of interesting information contained in HOLCOMB's book, and all those who are in any way interested in the problem of the origin of syphilis in Europe will want to read it. It represents a really first class piece of scientific detection. Dr. HOLCOMB may perhaps be persuaded to try his hand at a few of the many other problems of a similar nature which litter the field of medical history.

New York University. M. F. ASHLEY-MONTAGU.

Wilhelm Fabry von Hilden.—*Von der Fürtrefflichkeit und Nutz der Anatomy.* Edited by F. DE QUERVAIN and H. BLOESCH. xvi+ 203 pp., Leipzig : SAUERLÄNDER & Co., 1936.

WILHELM FABRY, known to the learned world as FABRICIUS HILDANUS or GUILHELMUS FABRICIUS, was born at Hilden not far from Düsseldorf on June 25 1560 and died at Berne in Switzerland February 15 1634 (GARRISON incorrectly gives the date as 1624). Generally spoken of as " The Father of German Surgery " FABRY has been described by KARL SUDHOFF as belonging " zu den grössten Aerzten aller Zeiten," a view of the man in which all those who become acquainted with him must concur.

SUDHOFF has written an excellent account of FABRY (GUILIELMUS FABRICIUS HILDANUS, *Münchener Medizinische Wochenschrift*, No. 26, 28 June, 1910, 57, 1401-1403) in which, among other things, he pointed out the existence of the manuscript from which the present volume has been printed. The editors of this volume do not seem to have been acquainted with SUDHOFF's article, or if they were, Professor DE QUERVAIN at least, the writer of the introduction, has not made the best use of it, for what has been omitted of the life and work of FABRY renders the account given of him of not more than the most cursory value. No one unacquainted with the achievements of FABRY would be able, from a reading of this introduction, to gain the slightest idea of the true stature of the man. In view of the availability of SUDHOFF's notice of FABRY it is here unnecessary to dwell upon his life and achievements. Short accounts of him are to be found in GARRISON and in CASTIGLIONI.

The last two decades of his busy and most fruitful life FABRY spent as Stadtarzt in the city of Berne, and it was here that he wrote and in 1624 published his *Kurze beschreibung der fürtrefflichkeit (nutz) und nothwendigkeit der Anatomy*. The present issue of this work represents the intended second and revised edition which FABRY had prepared during the last years of his life. At his death the manuscript together with his letters came into the possession of the Bern Stadtbibliothek,

and now after a lapse of three hundred years FABRY's revised book is made available to the world by the "Société suisse d'histoire de la médecine et des sciences naturelles." It is a wonderful little book, and though much has changed since the time when FABRY wrote it, it still reads as freshly and as interestingly as it ever could have done. The picture it gives us of 17th Century medicine in its beginnings has surely never been equalled, for in this book the author set out to show the layman literally how, upon the necessary basis of anatomy, the body worked and how the surgeon and physician played their parts in keeping it in healthy working order. It is by its display of the uses of anatomy the first of the tracts on the uses of the dead to the living. "Es ist viel besser" writes FABRY "man thue die Proben auff den Todten als auff den Lebendigen." The book also represents one of the first, if not the very first, of the sound popular introductions to medical science. It is enchantingly written, and in its own day it must have made many friends. An English translation of this work is long overdue, and if no one else is willing to undertake it the reviewer threatens to do so.

New York University. M. F. ASHLEY-MONTAGU.

Walter Pagel.—*Religious Motives in the Medical Biology of the Seventeenth Century*. Reprint from the Bulletin of the Institute of the History of Medicine, 1935, vol. III, pp. 97-312. Obtainable from the Author or the Institute, Johns Hopkins University, Baltimore.

At first sight it might seem a very odd proceeding to search for religious motives in the medical biology of the seventeenth century. But it needs but a slight acquaintance with seventeenth century biology to realise that all biologists then read the Kabbalah, under the impression that such ancient mystical writings contained concepts of importance for them; or that theologians believed that research into the principles of generation in insects might throw light on the doctrine of original sin in an age of reason. Dr. PAGEL, by reason of his training and scholarship in Hebrew literature, is fitted, as are few others, to evaluate the contribution of Jewish thought to seventeenth century science; and it was not small.

The main argument of the monograph may be convenienly summarised in the following way; the origins of modern science are to be found in the strife between four factors, two on one side and two on the other. In the first place, theological Scholasticism allied with Aristotelian Rationalism. In the second place, theological Mysticism allied with experimental Empiricism. Once this cleavage is fully appreciated, much that was formerly inexplicable falls into its place in the history of the seventeenth century science. Theology, as one would expect

from its universal domination over men's minds, was on both sides in this struggle, only whereas rational theology (perhaps contrary to expectation) was anti-scientific; mystical theology (certainly contrary to expectation) was pro-scientific. The explanation of this paradox lies in the fact that rational theology was anti-magic and mystical theology was pro-magic. And the fundamental cleavage here lay not between those who would make use of reason and those who refused to do so, but between those who would make use of their hands and those who refused to do so. The theologians who declined to look through GALILEO's telescope were doubtless scholastics, and therefore already, as they thought, in possession of sufficient knowledge about the material universe. But others could easily have been found who would —although full of bees in the bonnet concerning the possibilities of magic—have been perfectly willing to look through the telescope. This paradox illumines many curious facts, e.g., the popularity of books with titles such as PORTA's " Natural Magic", or the interest taken in natural magic by the early Royal Society, or the standpoint taken up by men such as GLANVILL and BROWNE on the subject of witchcraft. *A priori* theorists could without qualms deny the existence of witchcraft, but those who were determined only to reason *a posteriori* could with difficulty distinguish it from experimental phenomena. The " lodestone " and the " sympathetic powders " were not so easily separable from one another.

In Dr. PAGEL's monograph this argument, though not propounded in essence for the first time, is worked out through untrodden regions with great detail and delightful ease. The cases of such writers as ROBERT FLUDD, AGRIPPA OF NETTESHEIM or QUERCETANUS, are minutely examined in the light of the general views outlined above. In particular one or two of Dr. PAGEL's discoveries are of especial importance, e.g. the speculative embryology contained in the " Idearum Operatricium Idea " of MARCUS MARCI (1635), who attempted to explain the development of the embryo upon optical principles. This brilliant Bohemian, hitherto ignored by historians of science, linked together the following trends of thought : (*a*) the old Aristotelian theory of embryogenesis, (*b*) the new rationalistic and mathematical attack on generation, (*c*) the new experimental approach, (*d*) the cabbalistic mysticism of light as the fountain and origin of things, (*e*) by his brilliant guess of centres of radiant energy, he anticipated the field theories, etc., of modern embryology.

Dr. PAGEL's monograph may be regarded as one of the most considerable contributions of recent times to the history of biology. It is difficult to write the history of modern science without some knowledge of the

history of modern philosophy. It is impossible to write the history of mediaeval and Renaissance science without some knowledge of the history of mediaeval and Renaissance theology. This is abundantly illustrated by the success of Dr. PAGEL's monograph.

JOSEPH NEEDHAM.

David Gregory, Isaac Newton and their Circle. Extracts from DAVID GREGORY's *memoranda*, 1677-1708. Edited by W. G. HISCOCK, Assistant Librarian of Christ Church. X + 48 pp. Oxford, printed for the Editor, 1937 (10 s.).

Finirons-nous un jour par connaître assez bien NEWTON? Après le mémoire de STUKELEY (*Isis*, vol. 27, nº 74, pp. 336-337), voici des notes de GREGORY couvrant la période 1694-1708.

Une utile préface donne quelques indications sur GREGORY et souligne les contributions que l'ouvrage apporte à l'histoire. DAVID GREGORY (1661-1708), neveu de JAMES GREGORY (1638-1675), professa à Edimbourg de 1684 à 1691, puis devint, à l'intervention de NEWTON, professeur d'astronomie à Oxford (1). Il était l'ami de l'auteur des *Principia*, sur qui il fournit des renseignements souvent très intéressants.

Le livre que nous devons à M. HISCOCK est constitué par un ensemble d'extraits d'un manuscrit inédit trouvé en septembre 1935 à Christ Church, Oxford, et de deux manuscrits, inédits aussi, appartenant à deux bibliothèques universitaires écossaises. « There seems little doubt that GREGORY's word is to be trusted » (p. V).

La première « entry », précédée d'une lettre inédite de COLLINS (et non de OLDENBURG comme il est dit par erreur p. 1) à NEWTON du 5 mars 1676/7, date de 1694, alors que le diary de HOOKE (*Isis*, vol. 25, nº 70, pp. 466-470), notons-le, s'arrête en 1693. Les renseignements relatifs à NEWTON concernent notamment la publication de la seconde édition des *Principia* (1713), la publication de l'*Arithmetica* (1707) et la dispute NEWTON-LEIBNIZ. L'entry du 21 décembre 1705 (pp. 29 sq.) est particulièrement précieuse : elle contient en effet une première version de ce qui allait être le fameux scholie général qui clôture les *Principia* à partir de la deuxième édition. Signalons une remarquable pensée de NEWTON (mai 1708; p. 42) : « Algebra is the Analysis of the Bunglers in Mathematicks ». Il est bien regrettable qu'il n'y ait pas d'entry datant de mai 1694, moment où GREGORY se rendit à Cambridge (cf. EDLESTON, p. XXXiii). Évidemment, GREGORY met en scène d'autres savants que NEWTON : c'est ainsi que dans ses notes, nous voyons défiler entre autres, pour

(1) On trouvera une bibliographie sur les GREGORY dans *Scripta Mathematica*, vol. IV, nº 2 (April 1936), pp. 177-179.

ne citer que des contemporains : BERNOULLI, CASSINI, FLAMSTEED, HALLEY, HOOKE, HUYGENS, LEIBNIZ, LOUIS XIV, RAY, TSCHIRNHAUSEN, VARIGNON, WALLIS (il y a, p. 8, une lettre de celui-ci), WREN, etc... etc... En appendice, une lettre inédite de CHEYNE à GREGORY.

Les notes ne sont ni très nombreuses ni très détaillées : ceci est imputable sans doute à la formation littéraire de l'éditeur (1). RIGAUD, qui voici un siècle montra dans son *Historical Essay*... (1838) l'importance des manuscrits de GREGORY ou en possession de celui-ci, méritait mieux qu'une simple mention en note (p. 27). Quant à l'index onomastique, disons-le tout net, il constitue, par son insuffisance, un véritable scandale. Quand donc tant d'auteurs intelligents et érudits se convaincront-ils qu'ils ôtent presque toute valeur à leurs œuvres, qu'ils les rendent inutilisables, en se contentant d'y annexer des répertoires informes ? Attendent-ils en vérité que le lecteur se charge lui-même du soin d'établir des index complets ?

Le livre est luxueusement et soigneusement imprimé. Il convient de remercier M. HISCOCK qui, dans des conditions sans doute ingrates, a mené à bien la publication de ces intéressants documents. Pourquoi ne publierait-il pas — ou du moins ne donnerait-il pas une analyse ou des extraits de — la correspondance NEWTON-GREGORY, encore inédite croyons-nous, et qui se trouve à Cambridge (cf. *A Catalogue of the Portsmouth Collection*..., pp. 35, 41 et 49; cf. aussi p. XXI) ?

JEAN PELSENEER.

B. N. Menshutkin.—*The works of M. V. Lomonosov on physics and chemistry*. 538 p., 4 portr., 1 pl., 59 figs. USSR Academy of Sciences, Moscow and Leningrad, 1936. (In Russian; 13 rbls., binding, 2 rbls.).

This is the latest link in a chain of contributions by BORIS NIKOLAYEVICH MENSHUTKIN (b. 1874) to the study of LOMONOSOV's (1711-1765) scientific works. The year 1902 marks the end or the pre-MENSHUTKIN era of the study of LOMONOSOV's writings; M. I. SUKHOMLINOV, the editor of the first critical edition of the collected works of LOMONOSOV published by the Academy of Sciences, died in 1901, and the fifth volume of his edition appeared in 1902; MENSHUTKIN began the study of the unpublished LOMONOSOV manuscripts and documents in 1902.

The various official and commercial editions of the collected works of LOMONOSOV which appeared in the XVIIIth and XIXth centuries were devoted, almost exclusively, to his literary, philological and his-

(1) Faut-il expliquer par cette raison aussi des coquilles telles que "the Procession of the Aequinoxes" (p. 40) ?

torical writings. This is not surprising, if one takes into consideration the importance of LOMONOSOV in the history both of the literature and of the language of the Elizabethan period. His scientific works received little attention; some of them were published in the middle of the XVIIIth century, and were not easily accessible; some of them remained unpublished, but they were at least known by title; the existence of others was not even suspected.

The first three volumes (1891, 1893, and 1895) of SUKHOMLINOV's critical edition, published by the Academy of Sciences in St. Petersburg, are of little interest to the historian of science, although some of LOMONOSOV's "natural philosophy" is preserved to posterity in versified form. The volumes IV (1898) and V (1902) of SUKHOMLINOV's edition contain, among other writings, about ten items of a scientific nature — chiefly reprints of books and papers which were published during LOMONOSOV's life time; the subjects include chemistry, atmospheric electricity, optics, geology, navigation, and astronomy.

In 1902, MENSHUTKIN began his studies of the LOMONOSOV manuscripts in the Library of the Academy of Sciences, and of the LOMONOSOV documents and correspondence in the Archives of the Academy. The preliminary results of these studies were published by MENSHUTKIN in the *Journal of the Russian Physico-Chemical Society* and in the *Notices of the St. Petersburg Polytechnic Institute*; reprints of these papers appeared in book form, in a limited edition of one hundred copies, under the title, M. V. LOMONOSOV as physico-chemist (in Russian; 300 p., ill., St. Petersburg, 1904). Two German publications ought to be mentioned in this connection : first, MENSHUTKIN's paper, M. W. LOMONOSSOW, der erste russische Chemiker und Physiker, in *Ostwalds Annalen der Naturphilosophie*, 4, 203-25, 1905; second, Physikalisch-chemische Abhandlungen M. W. LOMONOSSOWS 1741-1752, hrsg. von B. N. MENSCHUTKIN und MAX SPETER (Ostwalds Klassiker, Nr. 178; Leipzig, 1910).

MENSHUTKIN's paper, Bicentenary anniversary of M. V. LOMONOSOFF's Birthday, in *The Chemical News*, 105, 73-75, 85-88, 1912, and G. SARTON's paper, Le bicentenaire de la naissance de M V. LOMONOSOFF (1711-65), in the *Revue générale des sciences*, 23, 300-01, 1912, give a clear idea both of the contributions by LOMONOSOV to science, especially to physico-chemistry, and of the contributions by MENSHUTKIN to our knowledge of LOMONOSOV's scientific writings. The present reviewer has no intention of repeating the statements of MENSHUTKIN and of SARTON concerning the importance of LOMONOSOV's work; after a quarter of a century, these statements still stand.

The volumes VI and VII of the collected works of LOMONOSOV, published by the USSR Academy of Sciences in 1934, have been reviewed

by T. L. DAVIS in *Isis* 25, 153-54, 1936. These two volumes, devoted to LOMONOSOV's scientific writings exclusively, were originally scheduled to be published in 1911, for the bicentennial celebration. MENSHUTKIN's connection with the editing of these two volumes dates from the year 1907; he made the Russian translations from the Latin originals, and prepared notes and commentaries, discussing the separate works from the point of view of the historian of science; his philological co-editor, G. M. KNIASEV, prepared LOMONOSOV's Latin and Russian manuscripts for publication, and wrote notes and commentaries on the linguistic aspects of the texts and on the sources of LOMONOSOV's quotations. The printing of LOMONOSOV's texts included in the volumes VI and VII was begun in 1908 and completed in 1911, in time for the bicentennial celebrations, but the printing of the editorial notes of MENSHUTKIN and KNIASEV was in its initial stages; moreover, there was some delay in the making of the aurora borealis prints from LOMONOSOV's original copper plates. Then came the War and the Revolution. KNIASEV died in 1919. In 1922, and again in 1928, attempts were made to publish the volumes VI and VII. In 1929, MENSHUTKIN discovered that the manuscripts of his and KNIASEV's editorial notes were lost. In 1932, the aurora borealis prints, made in 1912 or 1913, were found. Excepting the title pages, the tables of contents, the prefaces, etc., the volumes VI and VII, published by the USSR Academy of Sciences in 1934, were printed in pre-war years — which accounts for the old spelling and the quality of the paper; incidentally, in the two copies of volume VI which I have seen, the pages 263 and 264, containing the beginning of the Dissertatio physica de corporum mixtorum differentia (1739), are missing.

The volumes VI and VII contain 22 and 8 scientific items, respectively, and include both unpublished and previously published (or partly published) material. The 131 pages of explanatory notes (by MENSHUTKIN and KNIASEV), variae lectiones, translations, and addenda, at the end of volume VI, belong to the first two papers only, Elementa chimiae mathematicae (1741), and De particulis physicis insensibilibus . . . (1742); if one takes into account that LOMONOSOV's text of these two papers is printed on 38 pages, or less than one third of the number of pages devoted to the surviving editorial notes, variae lectiones, translations, etc., it becomes apparent that the missing notes concerning the remaining 28 papers of volumes VI and VII constitute a heavy loss. The missing notes by KNIASEV are, apparently, irrevocably lost; new notes by MENSHUTKIN are promised as an addition to volume VII. The collected works of LOMONOSOV remain incomplete; his manuscripts contain much unpublished material; his correspondence remains unpublished. Let us hope that

MENSHUTKIN will be able to complete the work he has been carrying on for more than a third of a century.

There are good monographs dealing with the literary and philological aspects of LOMONOSOV's work. Now that about two score scientific writings by the first Russian scientist are available in the volumes IV to VII of his collected — still incomplete — works, a discussion of his importance to the history of science becomes possible. MENSHUTKIN's extensive monograph on LOMONOSOV's works on physics and chemistry is, of course, largely based on his own studies of LOMONOSOV's writings, although he uses, when necessary, the opinions of other scientists and historians of science. The first two chapters (p. 7-73), intended as a biographical introduction, contain also Russian translations of LOMONOSOV's early Latin dissertations, and among other source material (not included in the collected works published by the Academy), an interesting Program of public lectures in Russian on physics (1746). On the other hand, the remaining chapters contain, in addition to a systematic discussion of the writings of LOMONOSOV, a considerable amount of biographical data, so that the whole monograph is a very readable combination of a chronologically and systematically arranged discussion of the life and work of the great scientist. In several respects, the biographical data given in this monograph are more complete than those contained in MENSHUTKIN's biography of LOMONOSOV published in 1925. As for the source material, in the form of important documents, reprints of shorter works, excerpts from longer works, illustrations, etc., it ought to be pointed out that some of this material is not available in the collected works published by the Academy. Chapters III to VIII of MENSHUTKIN's book deal with LOMONOSOV's ideas concerning atoms and molecules, heat and cold, the structure of gases, electricity, the ether, the mass and structure of matter. Chapters IX to XIV deal with LOMONOSOV's early writings on chemistry, with his Dissertatio de generatione nitri (1749), his chemical laboratory, his industrial lobaratory work, with physical chemistry, and physico-chemical experiments. Chapter XV is devoted to LOMONOSOV's works on mining and metallurgy. Chapter XVI bears the same title as MENSHUTKIN's book published in 1904, "M. V. LOMONOSOV as physico-chemist", contains 42 pages, and deserves to be translated into a European language. There is an excellent index of names, and a good subject index. Bibliographical references are, unfortunately, incorporated into the text, and footnotes are practically absent; the titles of 44 scientific writings by LOMONOSOV are listed in the subject index, in the order in which these writings are reprinted or discussed in the text of the book.

A. P.

Ervin C. Shoemaker.—*Noah Webster, Pioneer of Learning* (New York, Columbia University Press, 1936).

SHOEMAKER's biography of NOAH WEBSTER which is published almost simultaneously with HARRY R. WARFEL's book on the same subject presents a puzzling problem to the reviewer.

It is not brilliantly written. On the contrary, one is always reminded of the typical style of doctorate dissertations. The " Summaries and Conclusions " at the end of each chapter represent an unharmonious alligation between a biographical evaluation of a great man and the college textbook with the usual mnemonic supports for the weaker student.

Nevertheless, SHOEMAKER's work is interesting. It is always a pleasant feeling to read the work of an author who draws on original sources. How often are errors and prejudices transmitted from one generation of writers to the next only because so many who find the time to write a book do not find the time to acquaint themselves with the facts around which they group their opinions. But SHOEMAKER presents the facts first before he goes on to pass his judgment. He did not shun the labor of working through hundreds of primers, readers, and grammars in order to present us a clear picture not only of the pedagogical work of his hero but also of the educational situation before and after the Revolution.

Mr. SHOEMAKER lets us cast a glance into a corner of the great workshop of history which we generally overlook. He himself does not philosophize about the ways of mankind. We cannot, however, avoid pondering over the fact that the development of the American nation and its relation to its English background would have been different, had there not been NOAH WEBSTER, the writer of the " Old Blue-Back Spelling Book " (first edition, 1783) which " taught millions to read and not one to sin;" the composer of the " Reader " (1785) which was one of the most important instruments of political indoctrination and integration of the young American Republic; and the compiler of the " American Dictionary " (1828) which " caused leadership in lexicography to pass from England to the United States," and made the young Republic conscious of the English language. The " Webster " melted the different parts of the United States not only into each other, but it helped to reunite the country with the English civilization which large groups of Americans hated as the symbol of reaction and suppression.

The student of the history of education finds in SHOEMAKER's book many other incentives to think. SHOEMAKER mentions, for instance, the astonishing variance that often existed between WEBSTER's theories and his practice as a writer of textbooks. He could easily have shown

that this same or even a greater variance of theory and practice existed between COMENIUS' ideas about teaching languages and his " Januae," the grammars he wrote for the use of his students. The same difference existed in the work of PESTALOZZI. Since the great COMENIUS laid the basis of the modern science of education, its development has not consisted so much of fundamentally new discoveries, as of diminishing the distance between the ideals of education and the reality of the educational procedure. The number of essentially new ideas added to the work of COMENIUS is small, only ROUSSEAU, PESTALOZZI and HERBARTH may claim to have contributed some new and basic patterns of thought.

The progress which has been made, nevertheless, in the field of education is due to the gradual inoculation of the ideas and ideals of the great pathfinders into the consciousness and conscience of more and more individuals and nations, to changes in our social morale and to the development of better psychological methods.

NOAH WEBSTER is not one of the great geniuses who have enriched mankind by basically new elements of civilization. Judgments about him have varied considerably. Some historians picture him as a rather dry schoolmaster, others as a robust political fighter. If we should characterize his role in the light of the history of education, we would not contrast the nationalist against the pedant. Rather his greatness consisted of a strange combination of pedantry, far-sightedness, and energy. He saw the educational prerequisites of the formation of the young Republic toward a culturally self-conscious nation, and he possessed the indefatigable zeal to apply his insights to the minute work of the textbook maker and the lexicographer. Exactly the fact which the usual form of history considers not worthy of mention made NOAH WEBSTER a historical personality : the fact that he was not only a nationalist prophet but also, and much more than that, the schoolmaster and an armchair scholar surrounded by outlines of textbooks for the youngsters and by cards filled with notes about sixty thousand or seventy thousand words of his mother tongue.

Today the " Webster " comprises a vocabulary of more than six hundred thousand words. But we understand the volume of labor which had to be done in order to lay the foundation of this American standard work if we read NOAH WEBSTER's own words : " I finished writing my Dictionary in January, 1825, at my lodgings in Cambridge, England. When I had come to the last word, I was seized with a trembling which made it somewhat difficult to hold my pen steady for writing. The cause seems to have been the thought that I might not then live to finish the work, or the thought that I was so near the end of my labors. But

I summoned strength to finish the last word, and then walking about the room a few minutes I recovered."

(Harvard University.) ROBERT ULICH.

Jean Torlais.—RÉAUMUR [1683-1757]. *Un esprit encyclopédique en dehors de l'Encyclopédie. D'après des documents inédits.* 448 p., frontispiece, facs., fig., Paris, DESCLÉE DE BROUWER, 1936 (20 fr.).

J'ai lu avec plaisir cette belle étude sur RÉAUMUR. L'auteur s'est évidemment donné beaucoup de peine pour se renseigner et il a utilisé des documents manuscrits de l'Académie des sciences et de la Bibliothèque universitaire de Genève. Son livre fourmille de faits intéressants; malheureusement les habitudes intellectuelles de l'auteur sont celles du journaliste plutôt que celles de l'érudit. Il n'indique que rarement la source précise d'un fait ou d'une affirmation, et ne ne nous permet guère de contrôler son dire.

Son ouvrage est arrangé comme suit : 1. Généalogie, famille de RÉAUMUR. 2. Les années d'apprentissage (Élève géomètre, pensionnaire mécanicien). 3. L'inventeur (L'acier, l'art des ancres, le fer-blanc, le thermomètre, la porcelaine). 4. L'insectologiste (pourquoi diable l'auteur emploie-t-il ce mot bâtard et atroce au lieu du mot usuel, entomologiste ?). 5. RÉAUMUR et l'Académie des sciences. 6. Le biologiste (Les fours à poulets, le musée de RÉAUMUR, le problème de la digestion). 7. Dernières années.

La discussion des enquêtes technologiques de RÉAUMUR et de ses inventions est agréable à lire mais manque de force et de précision. L'histoire du thermomètre, par exemple, contient beaucoup de détails que je ne connaissais pas, mais elle glisse trop vite sur des points importants, et ne nous donne pas les moyens de vérifier les faits cités ou de découvrir les documents relatifs à chacun d'eux (à vrai dire il y a une longue bibliographie sur la question à la fin du livre, p. 402-5, mais cela ne suffit pas). Cette histoire reste à faire; je recommande à celui qui l'entreprendra de lire ce chapitre; il y glanera quelques nouveautés.

L'auteur se laisse assez souvent aller à parler de choses qu'il ne connaît pas bien. Il n'est pas possible de faire cela sans se trahir de temps à autre. Exemple : « Et c'est ainsi qu'en septembre 1710, étant sur les côtes de Vendée avec ses gens, M. DE RÉAUMUR s'aperçoit par un pur hasard que les taches que font sur ses manchettes les grains de buccins deviennent pourpres au bout de quelques minutes et, de retour à son cabinet, curieux d'expliquer le pourquoi du phénomène, il met remarquablement en évidence les propriétés de la matière colorante existant dans la glande des buccins et les oxydations successives qui

sont nécessaires pour la faire virer au rouge. » (p. 44.) Des « oxydations » en 1710 !? Ses références aux lois de MENDEL (p. 136, 256) prouvent qu'il ne les connaît que par ouï-dire.

MEMOIRES
POUR SERVIR
A L'HISTOIRE
DÉS
INSECTES.

Par M. DE REAUMUR, de l'Académie Royale des Sciences.

TOME PREMIER.

Sur les Chenilles & sur les Papillons.

A PARIS,
DE L'IMPRIMERIE ROYALE.

M. DCCXXXIV.

FIG. 1.—Volume 1er de l'œuvre maîtresse de RÉAUMUR.
Un gros in-quarto, le mot « mémoires » mesure 168 mm. RÉAUMUR était âgé de 51 ans au moment de sa publication.

Une bonne partie de l'ouvrage est consacrée comme de juste aux *Mémoires pour servir à l'histoire des insectes* qui constituent la vraie base de l'immortalité de RÉAUMUR. Rappelons que le premier volume en parut

en 1734 quand l'auteur avait 51 ans, et le sixième et dernier en 1742; il devait vivre quinze ans de plus mais laissa son œuvre incomplète. En 1926 le professeur WILLIAM MORTON WHEELER (1865-1937) publia

MEMOIRES
POUR SERVIR
A L'HISTOIRE
DES
INSECTES.

Par M. DE REAUMUR, de l'Académie Royale des Sciences, de la Société Royale de Londres, des Académies de Peterſbourg & de Berlin, & de celle de l'Inſtitut de Bologne, Commandeur & Intendant de l'Ordre royal & militaire de Saint Louis.

TOME SIXIEME.

Suite de l'Hiſtoire des Mouches à quatre ailes, avec un Supplément à celle des Mouches à deux ailes.

A PARIS,
DE L'IMPRIMERIE ROYALE
M. DCCXLII.

FIG. 2.—Volume six et dernier.
RÉAUMUR avait 59 ans au moment de sa publication; il vécut 15 ans de plus mais ne compléta pas cet ouvrage.

une partie du vol. VII relative à l'histoire des fourmis (*Isis* 9, 445-47), et cette partie a été republiée depuis par E. L. BOUVIER avec des notes

de CHARLES PÉREZ (116 p., Paris, P. LECHEVALIER, 1929). Le Professeur WHEELER avait fort aimablement accepté de préparer le compte rendu du livre de TORLAIS pour *Isis* et semble avoir consacré à ce travail les derniers jours de sa vie; malheureusement il ne put l'achever (1).

Mais revenons-en aux *Mémoires*. Dans cette partie l'auteur nous a donné une série de croquis des correspondants de RÉAUMUR, tels que GILLES AUGUSTE BAZIN, CHARLES BONNET, ABRAHAM TREMBLEY, GABRIEL CRAMER, P. LYONET, et le Suédois CHARLES DE GEER. A ces biographies s'ajoutent quelques beaux portraits reproduisant des estampes du temps.

Le chapitre V est l'un des plus intéressants. L'auteur y discute entre autres choses la vieille querelle entre BUFFON et RÉAUMUR (deux hommes trop différents à tous égards, pour s'entendre). RÉAUMUR était un grand observateur (l'un des plus grands de tous les âges) et un analyste puissant. Les synthèses littéraires de BUFFON ne pouvaient que l'irriter et le dégoûter. Pour des raisons analogues les efforts trop ambitieux, trop synthétiques et trop littéraires des Encyclopédistes d'une part et des Jésuites de Trévoux (2) d'autre part, ne cessaient de l'agacer. Cela explique le sous-titre de l'ouvrage sans toutefois le justifier « un esprit encyclopédique en dehors de l'encyclopédie ». RÉAUMUR était en dehors de l'encyclopédie précisément parce qu'il n'était *pas* un esprit encyclopédique; à la vérité il s'était occupé de beaucoup de questions assez disparates, mais toujours en analyste; le point de vue synthétique ou encyclopédique lui était étranger et, qui plus est, lui répugnait.

J'en ai assez dit pour indiquer le grand intérêt de ce livre, surtout pour les lecteurs dont la curiosité ne s'embarrasse pas de trop de critique. L'auteur m'est inconnu. Il s'occupe de journalisme médical, et a déjà publié trois autres ouvrages que je n'ai point vus, notamment *Médecine du passé en Aunis et Saintonge* (Édition Rupella, CHARLES MILLON, La Rochelle, 1931); RÉAUMUR et CH. BONNET *d'après leur correspondance inédite* (A. DESTOUT, Bordeaux, 1932); *Sur la médecine et les médecins au temps présent et au temps de* MOLIÈRE (A. DESTOUT, Bordeaux, 1935).

GEORGE SARTON.

(1) Une biographie de W. M. WHEELER par F. M. CARPENTER paraîtra bientôt dans *Isis*. WHEELER n'était pas seulement un grand éntomologiste (surtout myrmécologue) mais un bon historien. Il faisait ses recherches historiques avec la même honnêteté que ses autres recherches. On ne saurait trop le louer pour cela.

(2) Les *Mémoires de Trévoux* furent publiés de 1701 à 1775 par les Jésuites établis dans cette localité (l'ancienne capitale de la principauté de Dombes en Bourgogne, réunie à la couronne en 1762) dans le but de combattre les philosophes et d'enrayer l'incrédulité croissante. Ils constituent une source fondamentale pour l'étude de la vie intellectuelle au XVIII^{e} siècle. Il faut se servir de la *Table méthodique* préparée par le P. CARLOS SOMMERVOGEL, S. J. (2 vols., Paris, 1864-65).

George Mackaness.—*Sir Joseph Banks. His relations with Australia.* xiv + 146 p., 15 pls. Sydney, ANGUS & ROBERTSON, Ltd., 1936. Price 7/6.

The sources of this historical monograph are "The Brabourne Papers", and the letters and documents pertaining to Sir JOSEPH BANKS in the Mitchell Library at Sydney, in the Parliamentary Library at Canberra, in the Library at the Kew Gardens, and in the 21 volumes of BANKS' correspondence in the Library of the Royal Society at London. Though concerned primarily with the relations of BANKS with Australia this study reveals many aspects of the scientific activities of this learned man, long-time President of the Royal Society of London and companion of Captain JAMES COOK on his first voyage, in which he visited the shores of Australia. His scientific standing, interest in exploration, and his knowledge (even though small) of Australia led to his acting as advisor to the British Government on all matters of colonization, exploration, and administration of this new continent. He was the confidential correspondent of the Governors of the colony and constantly endeavored to assist the colonists by the introduction of valuable fruits and vegetables, by supervising the shipments, and providing gardeners to care for the plants in transit. He was, however, very lukewarm about the introduction of sheep. He maintained collectors of the local fauna and flora. He was a protagonist for Captain BLIGH of *Bounty* and breadfruit fame, supported his appointment as governor, and defended him in his efforts to reform the abuses in the penal settlements, to restore discipline, and to suppress the illicit rum trade. Through BANKS' scientific interests, his relation to the Kew Gardens, and his activities in supporting botanical and zoological exploration, the remarkable flora of Australia, especially the eucalyptus trees, came to be widely known, and to some extent distributed. His collections of *Platypus*, *Echidna*, and the marsupials of Australia excited interest in the primitive mammalian fauna of that continent. The FLAXMAN-WEDGEWOOD medallion and DANCE's portrait of BANKS are reproduced.

CHARLES A. KOFOID.

Francis W. Pennell.—*Travels and scientific collections of* THOMAS NUTTALL. *Bartonia*, Proceedings of the Philadelphia Botanical Club. N° 18, 64 p., 6 pls., 2 figs. in text. 1936. Price $ 1.00.

THOMAS NUTTALL (1786-1859) was a Yorkshire printer who emigrated to Philadelphia in 1808 where he made the acquaintance of Professor BENJAMIN SMITH BARTON and WILLIAM BARTRAM, both eminent botanists. He was employed by the former from 1809 to 1811, succeeding FREDERICK PURSH, BARTON's earlier botanical collector, as revealed in the

BARTON papers recently discovered. From these papers and a survey of the meagre data of localities on herbarium specimens in the Academy of Natural Sciences in Philadelphia and in the British Museum, and of other records, the author has pieced out tentative routes of NUTTALL's extensive travels in the United States and Hawaii.

They fall into two periods, the first, prior to 1818 when he published his *Genera of North American Plants*, and the second, from 1818 to 1836. In 1841, NUTTALL returned to his native land to his family estate at Nut-Grove Hall near St. Helens on the road from Liverpool, but did not continue as active in his botanical work as formerly, except for an interest in rhododendrons.

The extent of his botanical explorations in America is summarized in two maps of his earlier and later travels, respectively. In the earlier period (1809-1817) his travels, except for those about Philadelphia, were, for obvious reasons, largely confined to the shores of the Great Lakes and to rivers. His river routes included a trip up the Missouri River to Fort Mandan in North Dakota with the Astoria Expedition and from the portage to the Fox River in Wisconsin down the Mississippi to its mouth. He also made trips from seaports into Georgia and the Carolinas, and down the Ohio River from Pittsburgh to Cincinnati and thence through the Cumberland Gap to Charlestown, South Carolina but returned to England for two years during the war of 1812.

In the second period (1818-1836) he travelled more extensively, often on foot, into the New England States, along the Atlantic seaboard, across Georgia and Alabama, down the Ohio again to the Mississippi and up the Arkansas River, and some of its tributaries, returning by way of New Orleans.

In 1834-1836 he joined the Second Wyeth Expedition across the continent by foot, horse, and canoe to the Columbia River, spending two winters in the Hawaiian Islands, and joining the *Alert* at San Diego in 1836 where he was known to the sailors as "Old Curious". One of these sailors was R. H. DANA of *Two Years Before the Mast* who had known him at Harvard University.

From 1825 to 1829 NUTTALL was lecturer in Natural History and Curator of the Botanical Garden at Harvard University at Cambridge. Here he lived the life of a studied recluse, with light duties in instruction. He published his *Introduction to Systematic and Physiological Botany*, and devoted much time to his ornithological studies, completing the *Land Birds* and *Water Birds* of his *Manual of Ornithology*. The Boston Society of Natural History honored him by election as its first president in 1830 but he declined because "he regarded himself as only a transient resident of Boston."

He resigned from his Harvard post in 1833 to join the Wyeth Expedition in 1834, doing a prodigious amount of botanical publication in the brief interval between these connections.

The author notes his various botanical discoveries along these routes, comments on his relations with PURSH, BRADBURY, BARTON and other botanists, touches lightly upon his ornithological researches, and notes his interests in other fields of collecting and natural history which were wide and varied. The two volumes of his *Genera of North American Plants* and his later botanical papers were well esteemed by the critics of his day and his botanical observations were both accurate and discriminating. He was an outstanding pioneer naturalist of a century past and laid enduring foundations of botanical exploration in north temperate America.

CHARLES A. KOFOID.

Santiago Ramón y Cajal (1852-1934).—*Recollections of my life.* Translated by E. HORNE CRAIGIE with the assistance of JUAN CANO. (Memoirs of the American Philosophical Society 8, xi+638 p., 80 fig.) Philadelphia, May 1937 ($5).

Whenever a foreign book has been reviewed in its original edition, it is generally sufficient to refer to that review when its translation appears. The *Recuerdos de mi vida* (Madrid 1901-17, 3a edición 1923), as well as the *Charlas de café; pensamientos, anécdotas, confidencias* (Madrid 1923) were very well reviewed by RAOUL M. MAY (*Isis* 8, 498-503). Dr. MAY was well prepared for his task for he it was who translated into English one of RAMÓN's great works, the *Estudios sobre la degeneración y regeneración del sistema nervioso* (2 vols., Madrid 1913-14; *Isis* 7, 280) under the title, *Degeneration and regeneration of the nervous system* (2 vols. Oxford 1928; *Isis* 12, 428).

However in the name of justice and wisdom, there must be exceptions to every rule. I think the present martyrdom of Spain justifies us in speaking again of one of the great men whom that country has given to the world. I shall not repeat RAMÓN's biography and other information given by MAY in his review, but offer a series of remarks which the book suggested to me.

To begin with as I referred to the Spanish civil war, it is distressing to read RAMÓN's statement that " our civil wars always last six or seven years " (p. 199).

RAMÓN Y CAJAL proved himself to be the founder of Spanish histology and neurology, and one of the greatest biologists of our time. His biography contains a number of valuable materials for the history of histology, and others may be found in the first chapter of his *Degeneration*

(vol. 1, 3-26, 1928). In that chapter he paid tribute to the pioneering investigations of the English physiologist AUGUSTUS VOLNEY WALLER (1816-70), made at about the time of RAMÓN's own birth.

It is clear that his success was largely due to his racial qualities, the sturdiness of his stock. The son of a poor country surgeon he was born in Petilla de Aragon—a little mountain town of Navarra situated strangely enough in Aragon! He had the characteristic qualities of a poor highlander: frugality, economy, prudence, tenacity; "I remember that once I spent twenty hours continuously at the microscope watching the movements of a sluggish leucocyte in its laborious efforts to escape from a blood capillary." (p. 278.) Such qualities were particularly precious considering the nature of his work; while a mathematical discovery might be due to a moment of inspiration, no histological discovery would be possible without an immense amount of research.

One will better appreciate his pioneering efforts if one realizes the conditions of anatomical study in Spain at the time of his youth. As a histologist he was practically self-taught. Says he (p. 252):

"Microscopic demonstrations being so easy, I was excessively surprised by the almost total absence of objective curiosity on the part of our professors, who spent their time talking to us at great length about healthy and diseased cells without making the slightest effort to become acquainted by sight with those transcendental and mysterious protagonists of life and suffering. What am I saying!—Many, perhaps the majority of the professors in those days, despised the microscope, considering it even prejudicial to the progress of Biology! In the opinion of our academic reactionists, the marvellous descriptions of cells and of invisible parasites were pure fantasy. I remember that at that period a certain professor in Madrid, who was never willing to muddle his mind by looking through the ocular of a magnifying instrument, characterized microscopic anatomy as *celestial anatomy* (1). The phrase, which became popular, portrays well the mental attitude of that generation of teachers."

This is confirmed by the impressions of ALBERT KOELLIKER (1817-1905), in his *Erinnerungen aus meinem Leben* (Leipzig 1892), who saw in 1849 a splendid French microscope in a Madrid laboratory, remaining unused because its owner did not understand its manipulation. I can easily imagine KOELLIKER's reaction for I had a similar experience a few years ago in the famous college al-Azhar in Cairo, when I was shown a beautiful telescope kept in a closed showcase of the library like an object of curiosity.

At the time of RAMÓN's examinations for the doctorate in medicine (Madrid c. 1877), the study of the history of medicine was compulsory,

(1) Useless anatomy, from the phrase "musica celestial." (Translator's note.)

and the official text was " a certain French treatise " (p. 249) which the author does not name. I suspect it was CHARLES DAREMBERG's *La médecine, histoire et doctrines* (Paris 1865), or his *Histoire des sciences médicales* (2 vols., Paris 1870), books which were remarkably good for their time but to which he was not properly attuned.

The second part of his autobiography is too technical for the general reader, even for the educated one, and the more the pity for certain of these technical pages are splendid, e.g., his description of the wonderful complexity of the insect retina (p. 577). Much else, however, is rather arid and difficult reading, as is unavoidable, if one bears in mind that the progress of histology is closely dependent on the methods of staining; for example; the discoveries of CAMILLO GOLGI (1844-1926) and those of RAMÓN Y CAJAL would have been impossible without the introduction of new staining techniques. This is brought out vividly in the following passages :

" It is a commonplace fact that scientific discoveries are a function of the methods used. A strictly differential technique having appeared, there follow immediately, in a logical series and in an almost automatic fashion, unlooked for clarifications of problems formerly insoluble or incompletely settled. And if this is true in respect of all the natural sciences, it is so most conspicuously in the realms of histology. For the histologist, every advance in staining technique is something like the acquisition of a new sense directed towards the unknown. As if nature had determined to hide from our eyes the marvellous structure of its organization, the cell, the mysterious protagonist of life, is hidden obstinately in the double invisibility of smallness and homogeneity. Structures of formidable complexity appear under the microscope with the colourlessness, the uniformity of refractive index, and the simplicity of architecture of a mass of jelly." (p. 526.)

" The histologist can advance in the knowledge of the tissues only by impregnating or tinting them selectively with various hues which are capable of making the cells stand out energetically from an uncoloured background. In this way, the bee-hive of the cells is revealed to us unveiled; it might be said that the swarm of transparent and invisible infusorians is transformed into a flock of painted butterflies." (p. 527.)

" When we apply a formula for selective staining originated by some scientist or other, we scarcely suspect the formidable amount of experimental work, the endless trials and tests which were required, in the first place, for the chance discovery of the new and useful reaction and, afterwards, for the task of determining exactly the optimum conditions for successful results. We should be inspired with heartfelt pity, rather than with base envy, by the rare triumphs in this class of inquiry. Oh, the feverish and impatient hours in which one anxiously awaits the fortunate reaction which flirts without surrendering ! For the most serious thing about the work of this kind is that whole years may be consumed in it without anything worth while being discovered. And I need not speak of the disappointment caused by the chance discovery of interesting reactions which afterwards, despite persistent trials, do not deign to reappear." (p. 571.) (1)

(1) It is fortunate that such difficulties are restricted to microscopic investiga-

These quotations will illustrate also the psychological interest of RAMÓN's reminiscences. There are many others equally interesting in that respect, e.g., on memory (p. 146) and on the genesis of some of his discoveries (p. 322, 386, 521).

In 1906 he received the Nobel prize in medicine, having to share it with his old rival GOLGI. His reactions to that great honor are very curious and revealing: not simply joy and pride, but fear (p. 548). Indeed such honors have to be paid for heavily (especially in Spain and at that time), for the scientist who has thus been distinguished finds it more difficult to husband his precious time and protect his solitude. As to GOLGI's reactions, they were equally curious but in a different way (p. 552). To be sure one should listen to his own account of the story, but in RAMÓN's he appears as an exceedingly egocentric individual.

When Clark University celebrated its "tenth birthday" in 1899, the Spanish histologist was already sufficiently famous to be invited among other European celebrities. His descriptions of Clark are amusing, and his comparison of it with the "Collège de France" rather puzzling. To be sure thanks to the genius of G. STANLEY HALL (1844-1924), that baby university had then obtained a European reputation, which is now unfortunately lost (*Isis* 7, 141-143). It had become in an amazingly short time a great institution, but not quite a "Collège de France." Somebody must have pulled his leg,—may be it was his "pleasant and solicitous mentor," the "somewhat eccentric Russian professor of mathematics" who remains unnamed (p. 492).

In spite of his intense concentration in the study of histology, his curiosity was not restricted to it; he always loved to draw and paint, and as a boy dreamed of an artistic career; he was one of the early friends of photography and investigated its chemical aspects; he made various inventions (e.g., improvement of the gramophone) and devoted much time to the study of abnormal psychology, somnambulism, hypnotism and allied phenomena. Here is his conclusion on that subject:

"In sum, and passing over here the incredible marvels attributed to certain mediums, I must say that the above-described experiments concerning suggestion caused me mingled sentiments of surprise and disillusionment: surprise at recognizing the reality of phenomena of cerebral automatism deemed thitherto tricks and deceptions of circus magicians; and sad disillusionment by the consideration that the human brain, which is so highly lauded, the 'masterpiece of creation' suffers from the enormous defect of suggestibility; a defect as a result of which even the most outstanding intelligence may, upon occasion, be

---

tions. Think how hard it would be for astronomers if they had to paint their stars with appropriate pigments in order to be able to observe them! (G. S).

converted by the activity of skilful suggesters, conscious or unconscious (orators, politicians, warriors, apostles, etc.), into the humble and passive instrument of deliria, ambitions, and greed." (p. 315.)

One of the motives of his gigantic activities was his intense patriotism; he wanted to redeem his beloved country from its lack of scientific spirit and from all the defects, disabilities and miseries bound up with that. However, his patriotism was not blind, and his love of the Spanish language did not conceal to him its limitations for international purposes. As soon as scientific efforts are raised above a certain level, they are of necessity international; the public of a highly specialized scientist (or scholar) is of necessity small and international; that public cannot be served well except by means of a language of international scope. As he remarked:

"There are only three peoples who enjoy the enviable privilege of using their native tongues in their scientific communications: the English, the French, and the Germans. Educated people of other countries have no choice, if they wish to make public their ideas, than to understand these three languages and to write in one of them. What right has Spain, a country of slender intellectual production, to try to impose the study of Spanish upon the Japanese, the Swedish, the Polish, the Russian, the Slovak, the Hungarian, the Dutch, the Rumanian, and the others who already spend most of their youth in mastering the three or four learned languages and write in them?" (p. 585.)

To conclude this review, I wish to say that the translation is apparently good. It reads well, the translator has added short notes explaining whatever needs an explanation for the non-Spanish reader and an appendix describing RAMÓN's last years and death (Madrid, October 17, 1934). The book is beautifully illustrated and well indexed. Physicians are advised to read it; histologists should read it. The book will interest and fortify them in many ways; above all it will reveal to them not only a great scientist, but a generous man. GEORGE SARTON.

W. H. Frost.—*Snow on cholera*, being a reprint of two papers by JOHN SNOW, M.D., together with a biographical memoir by B. W. RICHARDSON, M.D. and an introduction by WADE HAMPTON FROST. xlviii+vii+191 p., 2 folded maps. The Commonwealth Fund, New York, 1936. (Price $2.50.)

Epidemiology is something more than the total of established facts. It adds to these chains of inference beyond the bounds of observation which, when wisely laid, guide future research. SNOW's analysis of the epidemiology of cholera in London in 1848-1849 and 1853-1854 is a nearly perfect model of epidemiological research.

Prior to SNOW's work a general theory of infection closely approximating

modern views had, indeed, been clearly formulated by HENLE, in 1840, but it had not been widely accepted. The more common view related infectious diseases to microörganisms loosely; and in England the " pythogenic " theory was much in favor. Cholera presented a riddle peculiarly difficult to solve by the indirect method of inference from its mode of occurrence. The facts themselves were most confusing. Instances of local spread with every appearance of direct communication from person to person were offset by instances of failure to spread to those in close contact with the sick, and of the disease's developing without traceable relation to prior cases. Variations in local prevalence appeared to be capricious. It prevailed most severely in low-lying places, and in a notably filthy environment, but the exceptions to these and similar facts were too numerous to be disregarded. How SNOW perceived the thread of consistency which connected a seemingly chaotic mass of facts and followed it through to the conclusion that bacteriology has since confirmed, he himself tells plainly and simply in his treatise " On the Mode of Communication of Cholera," published in 1855, and his address " On Continuous Molecular Changes, More Particularly in Their Relation to Epidemic Diseases," delivered in 1853. The first of these is an exposition of his theory, evidence, and methods as applied to cholera. The second is important as connecting his views on cholera with his broad conception of epidemic diseases in general and relating these, in turn, to other natural phenomena.

The two treatises are reprinted in full, that on cholera from the 2nd edition (1855), the first appearing in 1849. Dr. SNOW also did much to advance the technique of the use of anaesthesia by ether and to support the Medical Society of London. He will be remembered for his model epidemiological study in which he showed from statistics of morbidity and mortality from cholera that the cause of the disease was at least mainly water-borne and that the contagion was due to feculent water and air.

CHARLES A. KOFOID.

Paul Diepgen.—*Die Frauenheilkunde der alten Welt* (W. STOECKEL, *Handbuch der Gynäkologie* XII. Bd. I. Teil), München, Verlag von J. F. BERGMANN, 1937. 348 pp. with 64 figures in the text. (RM. 30.00, bound RM. 38.00.)

The greater part of this work is devoted to the history of gynaecology among the Greeks and Romans down to 400 A.D. (pp. 97-321). The first part, however, covers not only the pre-classical civilizations of the Near East, but also the Far East, as well as primitive mankind in general, with even a brief section on the aborigines of America. Within the

respective sections the material is arranged according to the departments of modern medicine and gynaecology, viz. anatomy and physiology, obstetrics, pathology, diagnosis, therapeutics and hygiene. Each section also contains a preliminary discussion of the sources and the social position of women. The general introduction reviews the historiography of the subject, and two indices, of names and of matters, cover the contents thoroughly. A second part is to cover mediaeval and modern times.

Most of the material is necessarily technical and can be appreciated only by an expert. Nevertheless its general aspects cannot fail to interest the layman also. The development of gynaecology becomes an important factor in history when we consider its rôle in the tremendous expansion of the white race during the last century with all the ensuing features of human progress. One wonders, as he takes up this book, whether the same factor operated in antiquity. The question cannot be answered unequivocally. The Greeks brought the science and practice of gynaecology to a much higher level than their predecessors; but even so it is doubtful whether their achievement effected a sufficient conservation of life to be of historical importance. It may even have been more important in a negative way through the restriction of offspring. The ancients reconnoitered all the various aspects of contraception, abortion and infanticide; but they did not achieve the technique of modern birth control and they did not formulate so rigorously the ethical implications of abortion and infanticide (pp. 297-302). The result was that offspring was restricted just the same, but with much greater recourse to violent means. The aristocracy of both Greece and Rome patently and ruthlessly committed race suicide. It was Christianity that turned the tide.

The book is written exclusively for physicians, though with the hope that it will not be useless to philologists and historians also. The data of ancient literature, both technical and other, are assembled under the respective departments of the subject with little or no explanation of their relation to each other or to scientific fact. The author recognizes this method frankly. In the introduction (p. 13) he declares that he is not concerned with the dates and sources of the existing texts or with the authorship of this or that theory or practice. This is the province of the philologists. And in the conclusion (p. 310) he remarks that he has not deigned to compare ancient lore with modern knowledge and practice. That is left to the reader himself.

This procedure was perhaps justified, if only in the interests of space. The former task was probably impossible in the present state of knowledge, with the history of ancient medicine only partially investigated

and many of the documents still unpublished. It is doubtful whether the history ever can be properly illuminated from the extant material. Nevertheless if the subject is to aspire to *Kultur-* and *Geistesgeschichte*, as the author claims it does, it cannot afford to abandon the critical faculty of tracing the authors and systems of ancient science. For without that it becomes a mere mass of casuistry, and indeed many pages in this work, which catalogue unconnected and conflicting data, give just that impression. To acquiesce in such a situation would be to declare bankrupt the history of ancient medicine. The research which the author calls philological will have to be pursued to the limit, and historiography will have to take cognizance of its results.

The omission of commentary indicating the correctness of ancient theories and practices deprives the book of a large part of its usefulness to others than physicians and contributes still more to the impression of superficiality. For example there are three references to the case of the Persian queen ATOSSA, who had a tumor on her breast that burst and spread, but was duly cured by DEMOCEDES (pp. 100, 237, 309); but there is no explanation of the malady or the means by which it might have been cured. DEMOCEDES, the greatest physician in Greece before HIPPOCRATES, is known chiefly from HERODOTUS (III, 125, 129 ff.), and an expert statement or explanation of the plausibility of this episode would have been appreciated.

The book is thus in part a mere collection of data. In this aspect it seems to be a very thorough piece of work. I have found scarcely any omissions. A passage from POSIDONIUS in STRABO (III 165) might be added: A Massiliot living in Liguria once learned that a woman in his fields had borne a child and immediately resumed work. He was horrified and sent her home on a vacation with pay. The story of TIRESIAS (HESIOD *fragment* 162, OVID *Metamorphoses* III 316 ff.) might have been used in reference to *libido* (p. 142). Ancient medical documents are cited freely from the standard editions and translations; but the documentation from non-technical sources is less accurate. This material was often gathered from secondary works and not traced to its sources. The labor of LETO at the birth of APOLLO (p. 173) should have been cited from the Homeric *Hymn to Apollo*. On p. 313 LIVY is quoted as saying that the Romans in 349 B.C. raised an army of 420,000 with 3000 Aequian and Volscian horse. The passage of LIVY, which is not cited, actually says 10 legions of 4200 infantry and 300 cavalry apiece (LIVY VII 25, 8). Such citations as are given seem unnecessarily cumbersome, including a German translation with author, title, date, place and page, so that there is a note of three whole lines for each citation of a common classical text.

The author seems to feel himself somewhat at sea when outside the range of technical literature, as is still more apparent from some passages on general matters, such as the social position of women. A Hellenistic terracotta from Cyprus (FIG. 33) is used to represent Minoan culture, and the Venus of Cyrene, also Hellenistic (FIG. 35), is associated with Hesiodic poetry! The author seems to prefer the latter to the Victory of Samothrace as the Greek ideal of feminine physique. A Hellenistic statuette from Greece is labeled " Römerin in Strassentracht " (FIG. 37), and a Tanagra figurine of the 4th cent. B.C. (FIG. 38) is used to illustrate a fashionable type described by MARTIAL and JUVENAL! On p. 313 the author, referring to a minor work dated 1809, adopts the view that the plebeians and patricians in primitive Rome were of different races and that it was a mistaken policy to allow them to intermarry.

It is ungracious, however, to judge a book by its least essential parts. In the proper field this work is compentetly done, and the deficiencies are probably due in the main to the present state of the knowledge of the subject.

(University of Illinois.) AUBREY DILLER.

The Papyrus Ebers. The Greatest Egyptian Medical Document. Translated by B. EBBELL. LEVIN & MUNKSGAARD, Copenhagen, 1937. 135 pp. Kr. 14.00.

Of all the Egyptian medical papyri, the Ebers and the Edwin Smith are the most interesting. The Edwin Smith, representing unbiased empirical observation, is in its scope limited to surgery. The Ebers, on the other hand, by far the longest of all the medical papyri, is not as uniform in character; it contains prescriptions, descriptions of diseases, rational as well as magic pathology and therapeutics. But in its scope it is much more comprehensive; a glance at the table of its contents as given in this new translation (p. 27) shows that it deals with nearly all branches of medicine. Edited by EBERS in 1875, transcribed into hieroglyphs by WALTER WRESZINSKI in 1913, the papyrus Ebers was translated into German by H. JOACHIM as early as 1890. But in recent years, the surprisingly high standing of the Smith papyrus (1) has attracted so much interest that the Ebers fell into neglect. CYRIL P. BRYAN's publication (2), based on JOACHIM's translation, was an anachronism rather than an advance. It is to B. EBBELL that credit must be given for having emphasized again the importance of the

(1) Edited by the late JAMES HENRY BREASTED (Chicago, 1930; *Isis*, 15, 355-67).
(2) *The Papyrus Ebers*, London, 1930.

Ebers papyrus in a paper in 1932 (3), followed now by a new translation based on WRESZINSKI's transcription together with an introduction where EBBELL summarizes his own appreciation of this papyrus in particular and of ancient Egyptian medicine in general.

The absolute necessity for a new translation is best proved by its amazing deviations from that of JOACHIM. When JOACHIM (4) writes : " Dies ist das Buch von der Heilung aller Krankheiten. Möge mich Isis heilen, sowie sie Horus heilte von allen Schmerzen, die ihm sein Bruder Set angethan hatte " etc. and when EBBELL renders this passage by (p. 29) : " Another recital for loosening any bandage : Loosened was the loosened one by Isis, Horus was loosened by Isis from the evils done to him by his brother Seth " etc.—it is hard to believe that both refer to the same text. Of course, it is necessary to await the philological criticism by competent Egyptologists before this new translation can be accepted as authoritative. It will also be their task to pass judgment on such mysterious translations as " I have seen that it has happened through me greatly " (p. 83) (5) or " The beginning of ointment for the order of the members " (p. 94). Here " members " is a translation of " mtw " a term which may mean such different things as male member, vessels, and again " muscles, sinews or ligaments " (p. 94 footnote). If throughout EBBELL had left " mtw " untranslated instead of choosing somewhat arbitrarily amongst its variants, he would have avoided such awkward and meaningless expressions as " the members of a toe " (p. 95) etc. and would, on the other hand, have impressed the reader with the many possibilities of this word.

This latter example leads to the most important aspect of the work both from the medico-historical and from the author's point of view. In the foreword, EBBELL expresses the hope that he may " have succeeded in determining the sense of many names of diseases and symptoms and in identifying various drugs "; besides, he believes to have found out the correct medical interpretation of " most of the descriptions of diseases." He, therefore, expects his translation " to deepen the knowledge of the Papyrus Ebers, and give the readers a fairly clear impression of its interesting medical contents and of the high level to which the ancient Egyptian medical art had attained." The identification of many names of diseases, symptoms and drugs by EBBELL is the result of long

(3) *Papyrus Ebers und die altägyptischen Ärzte.* In : *Acta orientalia*, X, 1932, pp. 95-107.

(4) *Papyros Ebers*, Berlin, 1890, pp. 1-2.

(5) I refer to the pages of EBBELL's translation. EBBELL constantly gives columns and lines of the Egyptian text but since these lines do not coincide with those of his translation, this kind of quoting is of no avail to the reader.

labour which has found its expression in various articles published in the *Zeitschrift für aegyptische Sprache* and the *Acta orientalia*. In an appendix to the translation he lists Egyptian words whose meaning has not yet been accepted and refers some to his earlier papers. Yet even on superficial reading of the translation, one becomes doubtful as to the reliability of these identifications when one meets with such curious expressions as : " purulency in the jugular region " (p. 46) or " haematuria in the heart " (p. 57) and these doubts become even greater upon further analysis of EBBELL's methods.

The appendix refers under " nśjt = epilepsy " to a former article (6) where the reasons for this identification are stated. In a passage of the Papyrus Ebers (cf. translation, p. 51) " nśjt " is compared to " hjt " which latter EBBELL thinks to connote cramps, and the pap. Berl. 9,8 seems to refer " nśjt " to the influence of demons. This to EBBELL points to epilepsy and he sees final confirmation in the fact that the remedies against " nśjt " are partly magic, such as incantations and the use of substances also prescribed against epilepsy by Greek and Roman authors. But the interpretation of " hjt " as cramp is already a conjecture, and the Pap. Ebers at least gives only rational remedies for " nśjt " with the one possible exception of donkey's testicles. Besides, blood, testicles, excrements, etc., were used by the later Greeks and Romans for many various diseases. Even the lichen equi upon which EBBELL lays such emphasis (7) is mentioned by PLINY as a remedy not only for epilepsy but for urinary calculi (*Nat. Hist.*, 28, 213), for loose teeth (*ibid.*, 28, 180) and to expel a dead fœtus (*ibid.*, 28, 252). In addition, EBBELL is faced with the awkward fact, that " nśjt " may be localized in the belly and the eyes. If he explains this as belief in the formation of a materia peccans in the belly and as a reference to optic aura (8), this is pure arbitrariness. GRAPOW has already questioned the correctness of this interpretation and pointed out that the group of prescriptions against " nśjt " in the Ebers (cf. translation, pp. 104-105) also includes a recipe against scabies (or a similar disease) (9). This latter difficulty, it is true, would not exist for EBBELL since what seems scabies to GRAPOW seems " wandering (?) dropsy " to him (translation, p. 104). This in itself is another example for the unreliability of such identifications.

In a group of cases and prescriptions dealing with " śtt " (p. 63 f.), the translation opens with : " The beginning of remedies to remove rheumatism in the sacral region " while the third case has : " ... if thou examinest one who suffers from phlegm " etc. In a footnote (p. 64) EBBELL tries to justify this arbitrary procedure by saying that the word " śtt " designated both " rheumatism or rheumatic pains " and " the name of the ' phlegm,' one of the disease-producing humours," and he adds that " śtt " and the Greek " rheuma " probably had the same primary sense. His only reason for interpreting " śtt " as " phlegm " seems indeed to be the idea that this translation would establish

(6) *Ztschr. f. aegypt. Sprache*, etc., 62, 1926, pp. 13 ff.

(7) Cf. *ibid.*, p. 15.

(8) Cf. *ibid.*, p. 14.

(9) HERMANN GRAPOW, *Untersuchungen über die altägyptischen medizinischen Papyri*, I. Teil, Leipzig, 1935, pp. 51-52.

a parallel to cases described by the Greeks (cf. pp. 25-26). Here as well as in the case of epilepsy EBBELL's identifications are widely influenced by comparison with Greek medicine. The same can be said of his use of the word " catarrh " (cf. pp. 64 and 71) which implies such definite Greek nosological concepts.

EBBELL draws attention to the fact that in most cases the Egyptians had names for simple symptoms only. If, therefore, the physicians referred to more complicated diseases not characterized by one single symptom, they had to give a description instead of using a name (cf. pp. 13-14). Of such descriptions or " cases " as they are usually called, EBBELL counts forty-five in the Papyrus Ebers (cf. p. 13), and in the accompanying footnotes he has tried, wherever possible, to diagnose them according to modern medical conceptions. I think that he has sometimes gone farther than the scanty data allow.

Page 126 of the translation relates " Instructions concerning a swelling of vessels." The case is described as follows : " If thou examinest a swelling of vessels on the leather layers (i.e. the cutis) of any limbs, and its appearance is growing on account of serpentining of the serpentry, and they (i.e. the vessels) have formed many knots, that which is like something inflated with air, then thou shalt say concerning it : it is a swelling of vessels." The physician is then advised not to put his " hand to such a thing," to prepare " the healing of vessels in all limbs of a man " (EBBELL considers this " a designation for a special ointment ") and to recite a spell. In this spell he addresses the vessel with, in part, the following words : " which jumps... in the midst of these limbs because thou unitest with Chon's unions." EBBELL interprets " jumps " by " i.e. pulsates " and it is apparently this expression which had led him to say of this case " This probably refers to aneurysma arterioso-venosum." (p. 126, footnote 1). I must confess that I am not even convinced of the probability of such a diagnosis. An aneurysma arterio-venosum is a rare disease and the fact that the vessel is referred to as " jumping " in an *incantation* does not justify such a diagnosis of a case which rather reminds me of—possibly inflamed—varices.

The examples cited are not meant as mere criticism of EBBELL's identifications and interpretations. He has spent much ingenuity and acumen on them and it would certainly not be easy to suggest valid alternatives. It is nevertheless necessary to emphasize the fact that in most cases they are mere conjectures, and thus to prevent the reader from accepting them uncritically.

But apart from serving as illustrations of doubtful points in EBBELL's translation, the examples also have a bearing upon some of EBBELL's general views on Egyptian medicine. Among EBBELL's undeniable achievements is his opposition to some exaggerated views about the role played by magic in Egyptian medicine. In the Papyrus Ebers, he counts altogether twelve cases where spells are recommended (p. 18) : certainly a small fraction compared to the abundant use of drugs. But when

he tries to show that they were used either " to console the patients in their pain " (p. 18) or to give hope in untreatable cases (cf. p. 19), he overreaches his mark. For concerning the two spells against burns, there is no evidence that " It was certainly to console the patients in their pain that a narrative was to be recited " etc. (p. 18.) And the argument for the untreatable cases rests above all on the case of supposed aneurysma arterio-venosum of which we have shown above that its interpretation is more than doubtful. EBBELL does not altogether exclude magic beliefs from the realm of the Egyptian physician. However, he confines them to such diseases as by necessity must have appeared inexplicable. His chief example is epilepsy (cf. pp. 19 f.) but unfortunately this identification, as I have shown above, is far from certain. Thus I believe that EBBELL's theories on this point are not supported by incontrovertible evidence. It seems that the way of philological analysis may lead us farther. EBBELL reminds us of the fact that the Papyrus Ebers is a compilation of various ancient works (p. 12) and he himself makes very interesting comments on some such parts viz. the book on the " mtw " and the glosses (cf. pp. 21-23). GRAPOW in a very detailed study has recently tried to separate the different sources. He has also drawn attention to the fact that the use of magic increases with the course of time (10) and its use may therefore be explained on a chronological basis rather than by contrasting the character of the various diseases.

Near the end of his introduction EBBELL says : " Thus we see that Greek medicine is by no means original, but has taken over very much from Egyptian medicine and can only be looked upon as a further development of the latter." (p. 26). And he climaxes this extremist view by the demand to replace the Greek ASKLEPIOS by the Egyptian IMHOTEP " as the patron genius of medicine " (*ibid.*) (11). It is to the memory of the latter that the work is dedicated.

There is no a priori reason why the Greeks should not have borrowed from the medical knowledge of their neighbours. On the contrary, the question as to the extent and sources of such influence ought to be studied in much more detail and more systematically than has so far been done. EBBELL's conclusion, however, is based on scanty and uncertain evidence and in any case, the material does not at present allow of such sweeping generalizations as he attempts. In some instances EBBELL has identified Egyptian terms by comparison with Greek and Latin authors. But it is a vicious circle, to turn around and

(10) Cf. H. GRAPOW, *Untersuchungen*, etc., II. Teil, Leipzig, 1936, p. 116 ff.

(11) About IMHOTEP see JAMIESON B. HURRY (1857-1930) : IMHOTEP (2nd ed., Oxford, 1928; *Isis*, 13, 373-5).

argue that since the *same* diseases were treated by the same drugs, " there can be no doubt that the Greeks must have borrowed them from the Egyptians." (p. 25.) The same objection must be made to his attempt to derive the humoral pathology of the Greeks from Egyptian sources (p. 25), since the interpretation of " śtt " as " phlegm " was only arrived at by analogy with Greek ideas. And his suggestion " that the word 'rwt may possibly correspond to the Greek χολή (bile) " (p. 26) is no more convincing, leading as it does to such ununderstandable translations as " Instructions concerning an enlarged gland of bile (?), which has lasted for many days." (p. 122.) Furthermore, EBBELL does not sufficiently distinguish between analogous phenomena in Egyptian and Greek medicine and actual historical dependence. If e.g. both the Kahun Pap. and the Hippocratic treatise " On Women's Diseases " refer women's ailments to the uterus (cf. p. 25), this does not prove dependence; for to what else exactly could an early rational pathology refer them?

But whatever criticism has been made, EBBELL has rid us of a translation which was certainly antiquated and has presented a new basis for discussion. It seems to me that the task for the future must lie in further philological as well as detailed medico-historical investigation and the planned critical edition of all the Egyptian " Medizinische Urkunden " together with translation and commentary (12) appears in this respect to be a desirable goal. Then, perhaps, it will be possible to say more about the origin, general character and influence of Egyptian medicine.

(The Johns Hopkins University, Baltimore, Maryland.) OWSEI TEMKIN.

N. A. Dobiash-Rozhdestvenskaya and **M. I. Burski**, editors.—*Agriculture in Western Mediaeval Records.* Translations and Commentaries. Publications of the Institute of the Hist. of Science and Technol., 5th series (History of Agriculture), 1st issue. xii+364 p., 69 figs. Moscow and Leningrad, Academy of Sciences USSR, 1936. (In Russian; 15 rbls., binding, 2 rbls.).

The Institute of the History of Science and Technology was founded in 1932, by a reorganization of the Commission for the History of Knowledge founded in 1921. A note concerning the first important publication of the Institute can be found in *Isis* 21, 440; notes on the numerous publications of the Institute have appeared in the Critical Bibliographies of *Isis* in rapid succession; both the high quality and

(12) Cf. GRAPOW, *l. c.*, II. Teil, p. 132 f.

the frequency of the publications of the Institute ought to be pointed out. The volume under review inaugurates the 5th series of the Publications of the Institute; this series will bear the title, History of Agriculture, and will be under the general editorship of N. I. VAVILOV, V. R. WILLIAMS, A. M. DEBORIN, A. I. MURALOV, and M. I. BURSKI. The history of agriculture in Antiquity—up to the end of the Vth century—will soon appear in separate volumes devoted to CATO, VARRO, PLINIUS, COLUMELLA, and PALLADIUS. The present volume offers the source material for a history of European agriculture in the VIth to XVth centuries. Volumes on the history of agriculture in the late Middle Ages and in the more recent past will follow; the forthcoming volume, on the late Middle Ages, will contain a survey of agricultural history during the whole mediaeval period, based on the source material collected in the present volume. The book under review does not, therefore, attempt to offer a history of agriculture in mediaeval Europe —it is merely a collection of data for such a history; the subtitle, Translations and Commentaries, indicates the limited scope of the book.

The present volume is the result of the collaboration of a group of mediaevalists and agriculturists—the majority of them women,— and this accounts for the non-homogeneous character of the individual sections, as far as the introductory surveys, the translations, and the voluminous commentaries are concerned. The arrangement of the translations of the various relevant passages found in mediaeval treatises and documents presented some editorial difficulties. The plan which was finally adopted offers, in each section, the translation of the larger, or of the more homogeneous, fragments as principal "texts," while the footnotes contain, as an integral part of the exegetic commentary to these "texts," a considerable amount of translations of analogous or complementary passages from various sources; occasionally, the commentaries occupy more space than the "texts." Each section begins with an introductory survey, the nature of which varies, according to the interests and training of the individual translator, from purely historico-bibliographical notes to technical essays. M. I. BURSKI contributed special agricultural notes which can be found throughout the book.

Section I, ed. by O. A. DOBIASH-ROZHDESTVENSKAYA and V. V. BAKHTIN; VI-VII cent.; 40 p. It offers "agro- and zootechnical fragments" from the books XII, XV, XVII, and XX Etymologiarum sive Originum by ISIDORE OF SEVILLE. The footnotes contain relevant passages from the Barbaric Law and from the writings of GREGORY OF TOURS.

Section II, ed. by H. S. ZEMSH; VIII-IX cent.; 84 p. Agricultural technology in Carolingian texts : The statutes of ADALHARD, Capitulare

de villis vel curtis imperii, Brevium exempla ad describendas res ecclesiasticas et fiscales, WANDALBERT's De mensium duodecim nominibus, signis, culturis, aerisque qualitatibus, and WALAFRID STRABO's Hortulus. The introduction (23 p.) offers an interesting essay on Carolingian agriculture.

Section III; ed. by V. M. KREMKOVA; X-XII cent.; 38 p. Agricultural technology in England and France, a collection of a large number of short passages from various sources, such as AELFRIC's Colloquium and Glossary, ALEXANDER NECKAM's De utensilibus, etc.

Section IV; ed. by E. C. SKRZINSKAYA; XIII cent.; 22 p. Agriculture in northern France. ESTOUT DE GOZ's short poem, Le conte des vilains de Verson, forms the text, while the Registrum reddituum Montis Sancti Michaelis and THIERRY D'HIREÇON's accounts furnish some of the material for the extensive commentary. Old French "chatel" caused some difficulties to the translator who does not seem to be familiar with the English words "chattel" and "cattle" and their legal Anglo-French background.

Section V; ed. by A. D. LUBLINSKAYA; XIII cent.; 34 p. English agricultural treatises—WALTER OF HENLEY's Husbandry together with an anonymous Husbandry (ed. LAMOND) furnish most of the text, while the anonymous Seneschaucie and ROBERT GROSSETESTE's Rules (ed. LAMOND) are the chief source of the commentaries.

Section VI; ed. by E. C. SKRZINSKAYA; XIII cent.; 66 p. De vegetabilibus by ALBERT THE GREAT—book VII, De mutatione plantae ex silvestritate in domesticationem.

Section VII; ed. by A. I. KHOMENTOVSKAYA; XIII-XIV cent.; 56 p. PETER OF CRESCENZI's Opus ruralium commodorum (parts of books I, III, VI, and book XII).

Section VIII; ed. by A. A. KONSTANTINOVA; XIV-XV cent.; 20 p. Agricultural technology in western Germany—a collection of numerous short passages from various sources.

Both the texts and the commentaries offer a considerable amount of information which ought to be of value to readers whose primary interests are in the fields of economics and sociology rather than of agriculture. The editors claim that this material has been brought together for the first time—in any language. It is an impressive record of the sufferings of millions of innocent human beings condemned to centuries of hard labor, the eternal story of man's inhumanity to man. It is to be regretted that the book has no index; the editors ought to prepare a combined index to the present volume and to the forthcoming volume on the history of agriculture in the late Middle Ages.

The illustrations—67 numbered pictures on 23 plates, at the end of the book, and the head and the tail piece of the preface—are arranged

chronologically, as far as possible, and their sources are listed in a special descriptive index to the illustrations. From the points of view of subject matter, geographical distribution, and style, they cover a wide range—from Irish MSS of the IXth century to livres d'heures and to German woodcuts in incunabula. The binding is flimsy, but it is well designed; the elaborate initial, A, of the black-and-red title, on the white binding, is reproduced from a VIth-century codex from southern Italy which is preserved in the Public Library in Leningrad. A. P.

R. T. Gunther.—*Early Science in Cambridge*. xii + 513 pp. Printed For The Author at The University Press, Oxford, 1937 (42/-).

Dr. GUNTHER's book, appropriately bound in light blue, is properly to be regarded as a miscellany, rather than as an historical account or analytic examination of Cambridge science, — it is nonetheless valuable for all that. The author's ten volumes on *Early Science in Oxford* (1920 ff.; *Isis* 6, 449-53, passim) it will be recalled, are individually and together extremely useful and generally provide as pleasant and interesting reading as it is possible to find in any work(s) of a similar kind. The present volume on early Cambridge Science, though it partakes to a considerable extent of the nature of a catalogue, is very readable.

The volume, for the most part, deals with the scientific instruments which Cambridge men either invented or developed, and these are described and in a large number of cases shown in excellent photographic or line reproduction; the figures add greatly to the value of the volume. Biographical accounts, assisted by contemporary anecdote and judgment, are given in connection with the greater number of scientists who figure within its pages, and the provenance of the instruments and their serial number is provided in every case. The fields covered in separate chapters are : Mensuration—Mathematics—Mechanics and Physics—Astronomy—Geography and Cosmography—Meteorology—Chemistry—Medicine—Anatomy—Physiology—Pathology, Apothecaries and Materia Medica—Zoology—Botany—Husbandry and Horticulture—Geology—Mineralogy. Appendices.

The proof-reading for this volume must have been very exhausting, and the author is to be congratulated on the fewness of the errors which remain, these are so obvious that no one is likely to be in any way misled. The author is not always accurately informed, but since no one is likely to appeal to the present volume as a final authority on the lives and achievements of Cambridge scientists, the few cases in which the author has erred or committed a solecism are of no matter. Dr. GUNTHER has again put us in his debt with a very attractive volume.

New York University. M. F. ASHLEY-MONTAGU.

III^e Congrès international d'histoire des sciences.—*Tenu au Portugal du 30 septembre au 6 octobre 1934, sous le Haut Patronage de S. E. le Président de la République Portugaise. Actes, conférences et communications.* xlix+462 p., planches et cartes. Lisboa 1936.

Le troisième congrès d'histoire des sciences fut pour tous ceux qui eurent le bonheur d'y assister la révélation d'un admirable pays trop peu connu, le Portugal. J'ai déjà décrit mes propres impressions dans *Isis* (22, 440-55, 1 pl., 1935). Nous devons à nos amis portugais une grosse dette de reconnaissance non seulement pour leur généreuse hospitalité, mais aussi parce qu'ils furent les premiers à se donner la peine de publier les Actes du Congrès. Ces Actes constituent un fort beau volume qui fait honneur aux organisateurs du Congrès, au comité portugais dirigé par le Prof. FERNANDO DE ALMEIDA E VASCONCELLOS (1), à son secrétaire ARLINDO CAMILO MONTEIRO, enfin et surtout à la science portugaise qui y est fort bien représentée.

Conformément aux habitudes d'*Isis*, ce volume n'est pas analysé dans ce compte-rendu mais il sera entièrement dépouillé dans notre cinquante et unième Bibliographie critique (*Isis* vol. 28). De cette manière chaque article sera classé à sa propre place sous le nom de son auteur, et de plus, grâce aux fichiers de Cambridge et de Paris on le retrouvera facilement.

Mais il est toujours utile de faire des exceptions et je crois bien faire en signalant ici les deux mémoires de ce volume qui me paraissent de beaucoup les plus importants, notamment ceux du Commandant FONTOURA DA COSTA et du Colonel JAGUARIBE DE MATTOS.

Le premier est une étude d'ensemble sur "La science nautique des Portugais à l'époque des découvertes" (p. 68-92). Il ne peut être question de le résumer ici, mais il vaut la peine d'en reproduire les conclusions :

Voici ce qu'on doit aux Portugais :

"1.—*Les instruments d'observation* : *a*) Adaptation de l'astrolable et du quadrant à la navigation; leur introduction à bord; *b*) Idée fondamentale du vernier actuel (nónio, de PEDRO NUNES).

2.—*Les astres* : *a*) Adaptation pour l'usage sur mer et rédaction des Régiments des heures de la nuit et de la hauteur du pôle par le Nord (Polaire); *b*) Adaptation maritime et rédaction des différents Régiments de la hauteur du pôle par le soleil, progressivement perfectionnés; *c*) Confection de la Première table solaire nautique, bissextile, déduite de Tables inconnues; et de la Deuxième, calculée par JOSÉ VIZINHO, d'après les tables *Ha-jibbur Hagadol*, de ZACUT; *d*) Organisation par ZACUT des Premières Tables solaires quadriennales, pour 1497-1500 (voyages de GAMA et de CABRAL), déduites de son *Almanach perpetuum*;

(1) Ou VASCONCELOS. Les deux orthographes sont employées par lui-même; il est donc impossible de décider laquelle est la meilleure. La même difficulté se présente pour beaucoup d'autres noms propres portugais (noms de personnes et noms de lieux). L'orthographe portugaise n'est pas encore fixée.

e) Confection des Deuxièmes Tables solaires quadriennales, pour 1517-1520, déduites de celles de l'Almanach de ZACUT par GASPAR NICOLAS; *f*) Reconnaissance, délimitation et dénomination de la constellation australe, la Croix du Sud, et organisation de ses Régiments; *g*) Identification et rédaction des Régiments du pôle par les méridiennes de différentes étoiles.

3.—*La boussole* : *a*) Réalisation embryonnaire du premier instrument de relèvement (*agulha de marcar*); *b*) Perfectionnement de l'installation du compas et adaptation de la suspension de balance, avant CARDAN; *c*) Adoption des mots *nordestear* et *noroestear* du compas comme expressions bien définies de la valeur et du sens (E. ou W.) de la future variation magnétique; *d*) Indication et utilisation des procédés pratiques pour calculer le *nordestear* et le *noroestear* du compas par le Nord (Polaire) par le soleil et par le Sud; *e*) Calcul de la première Table des amplitudes du soleil (LAVANHA, 1600); sa simplification, son perfectionnement et sa mise sous la forme qu'elle a encore aujourd'hui (MANUEL DE FIGUEIREDO, 1608); *f*) Invention du procédé, fantastique, pourtant longtemps si controversé de la mécométrie, calcul de la hauteur de l'Est-Ouest (longitude) par la variation du compas. Comme utile conséquence de ceci, première esquisse d'une carte d'isogones (CHRISTOPHE BRUNO); *g*) Première connaissance et notation de la déviation du compas et de l'attraction locale (Dom JOÃO DE CASTRO, 1538).

4.—*Les cartes marines* : *a*) Transformation des cartes rectangulaires en cartes carrées; *b*) Adoption du degré (de l'équateur) de 16 lieues 2/3, puis de 17 1/2 après avoir reconnu en pratique que la valeur primitive était trop petite; *c*) Adoption et utilisation, dans les cartes carrées, d'un ou de plusieurs méridiens gradués et de l'équateur gradué; *d*) Reconnaissance et énumération des défauts des cartes carrées (PEDRO NUNES, 1534-1537); *e*) Conception et étude de la ligne du rumb (loxodromie) avec sa caractéristique principale et son tracé sur les globes (PEDRO NUNES); *f*) Idée de PEDRO NUNES de la transformation des cartes carrées en cartes réduites, à échelle constante pour les méridiens, avec échelle des parallèles proportionelle au cos. Lat. moyenne; *g*) Invention des tronçons particuliers des lieues (LAVANHA, 1600) pour usage dans les cartes carrées en vue d'atténuer les défauts de ces mêmes cartes.

5.—*Les routiers* : *a*) Organisation progressive de très minutieux Routiers qui ont été avantageusement adaptés (et quelques-uns textuellement reproduits) par toutes les marines européennes; *b*) La littérature portugaise des Routiers constitue un monument qu'aucune autre nation ne possède.

6.— *Le pilotage* : a) Invention des différents procédés de pilotage lesquels ont été universellement employés presque jusqu'à la fin du XVIème siècle, quelques uns continuant même à être employés pendant une grande partie du suivant; b) Reconnaissance des côtes découvertes ou visitées, ce qui permit l'évolution rapide de leur cartographie."

L'auteur de ce mémoire n'est pas un inconnu pour les historiens de la science — du moins pour ceux qui sont vraiment éveillés. Ancien Professeur de l'École Navale et de l'École Nautique portugaises (1901-32), le Commandant FONTOURA DA COSTA, qui fut aussi Ministre de la Marine et de l'Agriculture (1923), s'était fait remarquer déjà par d'excellents travaux : *Tabuas nauticas* (Tables nautiques), en collaboration avec l'Amiral AZEVEDO COUTINHO et le Commandant PENTEADO; *Ás portas da India em 1484*; et, surtout, par son précieux livre *A Marinharia dos*

Descobrimentos, qui lui a valu le titre de Membre agrégé de l'Académie de Marine de France, le prix de Navigation de la même Académie (1936), et le titre d'Associé de l'Académie des Sciences de Lisbonne. Il est actuellement le Directeur de l'École Nautique et le Président de la Section de Lisbonne du Groupe portugais d'Histoire des Sciences.

J'oubliais de dire que les Actes ne contiennent pas seulement son mémoire sur la science nautique portugaise, mais aussi une étude également précieuse sur l'*Almanach perpetuum* de ABRAHAM ZACUT (p. 137-46).

Quant au mémoire de Col. JAGUARIBE DE MATTOS, il se rapporte aux «Idées sur la physiographie sud-américaine», et la première partie est une histoire de l'évolution des connaissances cartographiques relatives à l'Amérique du Sud et spécialement au Brésil « de CHRISTOPHE COLOMB au général RONDON ». Celui-ci est le fameux explorateur brésilien, CANDIDO MARIANO DA SILVA RONDON (né en 1865) qui, nous dit l'auteur, « bat tous les records du monde des relevés faits à pied ou à cheval dans des régions auparavant inexplorées ».

Depuis que j'ai lu (il y a longtemps !) l'histoire de la découverte (ou re-découverte) de la jonction des bassins de l'Orénoque et de l'Amazone par ALEXANDRE DE HUMBOLDT en 1800, le régime des fleuves de l'Amérique du Sud m'a toujours intrigué. Or sur la base des travaux de HERMANN VON IHERING (1850-), l'auteur nous annonce une conclusion tout à fait étonnante (p. 413).

"A la rigueur il n'existe point de grands bassins hydrographiques indépendants en Amérique du Sud. Non seulement les bassins de l'Orénoque et de l'Amazone, ainsi que ceux du S. Francisco et du Tocantins font cause commune, comme nous l'avons montré, mais tous les grands bassins de l'Amérique du Sud se communiquent directement à la surface de la terre les uns avec les autres."

A ce mémoire est attaché une très belle carte des fleuves principaux de l'Amérique du Sud, établie par l'auteur, à l'échelle 1 : 10.000.000.

Grâce à l'amabilité du Professeur VASCONCELLOS, je suis à même de donner les renseignements biographiques qui suivent sur le colonel JAGUARIBE DE MATOS (ou MATTOS). Né à Rio de Janeiro, en 1881, ancien élève de l'École Militaire du Brésil (Escola Militar), il s'est orienté des le début vers le service des cartes géographiques de l'État Major où il a contribué à la solution de plusieurs problèmes nationaux et internationaux, en confectionnant des cartes pour l'étude des démarcations avec les pays limitrophes, des levés pour l'Atlas du Brésil, et d'autres. En 1910, il a fait publier son «Plan de la ville de Rio de Janeiro» où, pour la première fois, sont marquées les grandes améliorations introduites par le préfet PASSOS et l'illustre hygiéniste OSVALDO CRUZ. Ce plan où sont rétablis les noms historiques des lieux a appelé l'attention publique sur le jeune officier qui, invité par le Général RONDON, a pris

la direction de la Section de Cartographie des Services confiés au célèbre explorateur brésilien, dont il fut, depuis lors, un des plus dévoués collaborateurs.

Le Col. JAGUARIBE a été à la tête de la Section Cartographique depuis 1910 jusqu'en 1932 et sous sa direction ont été confectionnés plus d'un millier et demi de dessins et études de terrain. Il a encore à sa charge la réalisation graphique de la *Carta do Estado de Matto-Grosso e regiões circumvizinhas*, laquelle, par une entente amicale avec la Mission Militaire Française au Brésil, sera imprimée à Paris par le « Service Géographique de l'Armée ». Il prépare aussi le rapport de cette publication qui est une vraie monographie sur tout le Brésil Centre-Ouest et sur la technique cartographique.

Lorsque le Président THEODORE ROOSEVELT est venu au Brésil en l'absence du général RONDON, celui-ci a donné ordre à JAGUARIBE d'accompagner l'illustre homme d'État et de lui faire connaître l'existence d'un fleuve inconnu, appelé « Rio da Duvida » qui, en hommage spécial au grand Américain, a été parcouru pour la première fois par le Président ROOSEVELT.

En plus de tout cela le Col. JAGUARIBE, ancien Directeur de la « Sociedade de Geografia do Rio de Janeiro », membre de la « Société de géographie de Paris » et d'autres sociétés scientifiques a été envoyé en mission par son gouvernement en Europe, où il at ravaillé au Service géographique de l'Armée à Paris, et recueilli une masse de documents et de vieilles cartes géographiques concernant son pays. Il a déjà eu l'occasion de publier quelques-unes de celles-ci.

Depuis décembre 1932 jusqu'à juillet 1935 il a vécu au Portugal, où il a pu augmenter considérablement sa collection de documents historiques (cartes et textes) concernant le Brésil. C'est ainsi qu'il a pu prendre part au III^{e} Congrès, où j'ai eu l'honneur de faire sa connaissance.

La publication des Actes a été faite avec beaucoup de soin par le Dr. ARLINDO CAMILO MONTEIRO. Il a envoyé des épreuves à tous les auteurs sauf à moi ! Il en résulte que mon discours présidentiel contient des fautes assez fâcheuses. Quant à l'orthographe des noms de lieux adoptée par lui (à la suite de MIELI), c'est du pur enfantillage.

GEORGE SARTON.

Lancelot Hogben.—*Mathematics for the Million.* xii+647 pp. New York : W. W. NORTON & Co., Inc., 1937, $ 3.75.

This book is probably the best introduction to mathematics that has ever been written. Hereafter there can no langer be any excuse for any one to plead that mathematics is beyond him, for no matter how unmathema-

tically minded the individual may be if he but undertakes to work through this book with no more application than the solution of a crossword puzzle would take he cannot fail to acquire an unusually wide working knowledge of mathematics. The book, which was written during a long illness in hospital, is a remarkable achievement of clear and painless exposition. It is the sort of book for which the Million for whom it was written would have given much if they could have had access to it during the days when they were being "taught" that nightmare — as it became — of all subjects, mathe*magics*, that form of low cunning which made so much of their youthful lives miserable, and their struggles with which put an untimely end, in many cases, to a noble ambition. In the reviewer's day (which is not so long ago) mathematics was taught by gentlemen who seemed possessed of an infinite capacity for giving pain, and to whom it was a positive increase in one's ignorance to listen. The antipathy towards mathematics which may be encountered in many scientists to-day is probably to be traced to unfortuante early experiences of similar kind. The serious retardative effects which such individuals not infrequently have upon the development of certain branches of science is a sufficient reason for taking stock of the manner of our contemporary mathematical teaching. It is a platitude to say that in the laying of good elementary foundations lies the secret of further happy advancement in the understanding and use of mathematics. Such foundations are excellently provided in Professor HOGBEN's book, and it is perhaps of significance that so good and so humane a work should come from one who is not himself professionally a mathematician, for apparently it takes one who is not a member of the esoteric circle of mathematicians to see the deficiencies in past and present mathematical teaching. Professor HOGBEN gives *reasons* for everything, moreover, he gives an operational history of the development of mathematics in its actual socially functioning contexts. This is admirable, but it takes a scientist with a social consciousness to do it. The moral should be obvious : If others are to be admirable they must develop appreciably more of a social consciousness than whatever it is that at present serves them in its place.

Something of the nature of Professor HOGBEN's book may be gathered from a transcription of its contents, which are as follows :

1, Mathematics, the mirror of civilization. 2, First steps in measurement, *or* mathematics in prehistory. 3, The grammar of size, order and number *or* translating number language. 4, Euclid without tears, *or* what you can do with geometry. 5, From crisis to crossword puzzles *or* the beginnings of arithmetic. 6, The size of the world *or* what we can do with trigonometry. 7, The dawn of nothing *or* how algebra began. 8, The world encompassed, *or* spherical triangles. 9, The

reformation geometry *or* what are graphs. 10, The collectivization of arithmetic *or* how logarithms were discovered. 11, The arithmetic of growth and shape *or* what the calculus is about. 12, Statistics *or* the arithmetic of human welfare. 13, Appendix to chapter 12. 14, Epilogue on Science. 15. Tables.

The book is simply and clearly illustrated by J. F. HORRABIN, and at the price at which it is offered it is a bargain.

New York University. M. F. ASHLEY-MONTAGU.

"Mathematics for the Million" by LANCELOT HOGBEN is an excellent example of the popular expositions of mathematics which seem to be increasing in number. The remarkable popularity of the book shows that it has caught the fancy of the public, and attests the ever present curiosity of the intelligent layman about the mystery that surrounds the Queen of the Sciences. However, one must still heed the famous reply of EUCLID to King PTOLEMY : "There is no royal road to geometry". Mathematics can never be made easy, although it is probably desirable to make it appear so. One of the most celebrated examples of these attempts to popularize mathematics was the intriguing "Calculus Made Easy" by SYLVANUS THOMPSON, with its cheering motto "What one fool can do, another can" (from an old simian proverb). Certainly many a college youth has been lured into these insecure fields by the initial simplicity of the book. It is probable that "Mathematics for the Million" will perform a similar function.

(*Indiana University*) H. T. DAVIS.

W. E. van Wijk.—*Le nombre d'or.* Étude de chronologie technique suivie du texte de la Massa compoti d'ALEXANDRE DE VILLEDIEU avec traduction et commentaire. x+158 p., 17 figs., folding table. The Hague, MARTINUS NIJHOFF, 1936. (Ten florins.)

W. E. van Wijk.—*De Gregoriaansche kalender.* Een technisch-tijdrekenkundige Studie. x+76 p.+1 p. (added leaf), 13 figs., folding table. Maastricht; publisher : the author; printer : A. A. M. STOLS; 1932.

These two important contributions to technical chronology are the product of profound and patient research carried on by VAN WIJK during more than a quarter of a century. For reasons which will be indicated below, the volume on the history of the Gregorian calendar reform was published first; we shall, however, begin with the volume on the Golden Number.

The very title of the 1936 volume indicates that it consists of two parts, the first dealing with the Golden Number, the second with the *Massa compoti* of ALEXANDER OF VILLEDIEU. The author begins with a discussion of the lunar calendar, of the Alexandrian cycle and Easter tables, and of the computus of DIONYSIUS EXIGUUS. Then follows a discussion of the perpetual calendar, the Golden Number, and the litterae signorum. Both astronomers and historians interested in calendarial and chronological problems will appreciate the logical and well-documented presentation of this technical subject matter; the reader is witnessing not a grafting of arbitrary chronological devices on the Roman calendar, but a gradual discovery of cyclical properties which are inherent in the calendar and which may serve, with a varying degree of convenience, the main objective of the ecclesiastical calendar —the determination of the Easter date.

The number of the year in the Lunar Cycle (enneakaidekaeteris) which, in conjunction with the Sunday Letter, permits one to find the Easter date, was designated as the Golden Number for the first time in the first verse of the *Massa compoti*:

Aureus in Jano numerus clavesque novantur ...

The *Massa compoti* was written, about A.D. 1200, by ALEXANDER DE VILLA DEI (ca. 1170-ca. 1240; cf. SARTON, *Introduction*, II, 616-17). The Latin text of the *Massa compoti* was published, for the first time, by ROBERT STEELE (in Opera hactenus inedita ROGERI BACONI, fasc. VI, p. 268-89, Oxford, 1926); this was not a critical edition; it was based on Brit. Mus. Egerton 2261, an early XIIIth century MS, with some variants from two other MSS. The VAN WIJK edition of the text of the *Massa compoti* is based on eighteen MSS of the XIIIth and early XIVth centuries; it is, of course, provided with the necessary critical apparatus. The French translation of the *Massa compoti* is followed by an elaborate commentary (pp. 85-131); the reader will find, in this commentary, many important and interesting notes collected by VAN WIJK in the course of his chronological studies.

At the end of the volume, the reader will find seven pages of bibliography, a perpetual calendar and other tables, and an index. There are beautifully printed tables throughout the text, and some of the elaborately reproduced illustrations, both in the text and on plates, are also of a tabular nature; there is a bibliographical index to the illustrations.

" Depuis l'introduction du calendrier grégorien en 1582 le nombre d'or a cessé d'être un moyen direct pour trouver l'âge de la lune; il fut alors remplacé

par un nouveau système de nombres, dont il devint l'index. Ces nouveaux nombres, les épactes grégoriennes, n'ont pas la même signification que l'épacte de l'ancien calendrier, qui est l'âge de la lune d'un certain jour; elles sont plutôt comparables aux lettres lunaires... Une description des épactes grégoriennes dépasserait les limites de cette étude." (p. 45)

A detailed study of the Gregorian calendar reform, forming an independent volume which is, at the same time, a Renaissance sequel to VAN WIJK's work on the mediaeval calendar, appeared in 1932. The colophon of the Dutch volume states that the printing was completed in the month of October, 1932. The 350th anniversary of the Gregorian calendar reform was not the only reason for the publication of VAN WIJK's book. The Gregorian calendar, " this jewel of Renaissance architecture," was threatened by modern reformers. To show the structural beauty of the Gregorian calendar was one of the aims of the author—and it must be admitted that he has succeeded, even if his work should have but little influence on modern calendar reformers.

The book begins with a survey of calendars in general and of the mediaeval Christian calendar in particular. The " pre-history " of the Gregorian reform is then recapitulated, and some neglected attempts are stressed. A detailed discussion of the reform project by ALOYSIUS LILIUS (ALOIGI GIGLIO) follows; similar but independent work by JOSEPH SCALIGER is reviewed; the role played by CLAVIUS and others is pointed out. Then comes a chapter dealing with the bull, *Inter gravissimas*, containing a Dutch translation and commentaries. A chapter is devoted to KEPLER's " Ein Gespräch von der Reformation des alten Calenders..." The last chapter gives an interesting survey of the introduction of the Gregorian—or of a similarly reformed—calendar in the various European countries; the details of the recent calendar reforms in the Balkanic countries are, occasionally, revealing strange twists in the minds of the local political and ecclesiastical authorities. A short bibliography, an index, and a table of the movable festivals of the XXth century conclude the book.

Both books were printed by A. A. M. STOLS, in Maastricht, and they may serve as examples of Dutch typographical excellence. As in the case of the 1936 volume, the hand-set tables deserve to be pointed out for their beauty of design and faultless printing. Both volumes are of the same size; the design of the page and the choice of type are the same. The plates of the Dutch volume are even more attractive than the plates of the French one, probably, on account of their subject matter—chiefly portraits; there is an index to the illustrations, with biographical notes.

A. POGO.

Club Alpin Français: Commission des Travaux Scientifiques, — *L'oeuvre scientifique du Club Alpin Francais*, (1874-1922). Paris 1936. vi + 518 pp.

As explained by the editor, Colonel LÉON MAURY, the scientific activity of the French Alpine Club falls into four periods, of which the first three are summarized in the present stout volume. From 1874 to 1902 there existed within the Club no official clearing house for scientific research. There were, however, numerous loosely connected projects undertaken by members, chiefly in the field of topography, and these were usually reported in the *Annuaires* of the Club. Through government and military surveys the cartography of the French Alps had already been fairly well developed. Hence it is not surprising that in this period the topographically inclined members of the Club should have turned to the almost virgin field of the Pyrenees. At the same time we find the beginnings of a number of more or less advanced studies in a wide variety of scientific fields, many of which might send the lay reader to a dictionary. The table of contents lists among others, orogeny, orography, mineralogy, glaciology, speleology, geodesy, geo-morphology, folk-lore, toponymy, hypsometry.

In 1903 this pioneering period was brought to an end by the creation of a special Commission of Topography which continued in existence until the war. Under its auspices attention was now turned chiefly toward the French Alps, in the hope of creating a specialized cartography sufficiently detailed and exact to keep pace with the growing demands of the Alpine climber. The outstanding member of the Commission was HENRI VALLOT. With the help of members of his family he undertook the triangulation and survey of the Mont Blanc chain, aiming at a final scale of 1 : 20.000 as opposed to the 1 : 50.000 of the great Siegfried map of Switzerland. VALLOT and his associates treated this enterprise as though it were a school for the conscience. In the endless stone slides which the ordinary Alpinist mutely curses during the dim first hours of the ascent, these meticulous surveyors felt called on to mark the exact position and altitude of each block which had a volume in excess of one cubic meter!

The other great name among the members of the Commission was that of PAUL HELBRONNER (*Isis* 6, 90-1). Single-handed, triumphing over a physical handicap, HELBRONNER successfully carried out with his own resources a project which would have challenged the capacity of any organized group of topographers, — nothing less than the complete and precise triangulation of the entire French Alps (except Mont Blanc). From 1902 until 1914 and again after the war, in a score of campaigns he established 1680 surveying stations (151 above 3000 meters) covering

some 19.000 square kilometers with a dense network. He even performed the delicate feat of tying Corsica into the mainland scheme, throwing in Elbe, Capraia and Monte Cristo for good measure.

From 1914 until 1922 the scientific activities of the Club, although lacking the supervision of a central body, were not totally suspended. Many of the maps begun before the war were brought to completion. And in 1923 a fourth period was inaugurated with the establishment of a Commission des Travaux Scientifiques, which has been pursuing a systematic study of Alpine nomenclature in co-operation with the Service Géographique de l'Armée.

What is the value of all this work? I am not competent to pass judgment on the actual substantive contribution of mountain-climbers to any of the sciences which they have cultivated. For the more important climbing centers they have unquestionably created maps surpassing in detail those already available. Yet even for their own practical purposes, I suspect that much of the effort has been supererogatory. And in the major branches of geological study, even including glaciology, I cannot help suspecting that the main work has been done by official surveys and by professional scientists, — who may have made mountain-climbing their avocation, — rather than by amateurs.

I have often listened to Alpinists (and even, as one myself, made the attempt), seeking to find rational justification for the pastime they pursue. Certainly scientific study cannot be its major, or even its secondary defense, any more than a stamp collector can seriously maintain that he cultivates his hobby in order to advance the knowledge of geography or history. On the other hand, — and this is perhaps the excuse for this review, — a report such as that of the French Alpine Club provides one more testimony, not only of the ramification of modern science, but also of its imperialistic, one might almost say heaven-storming energy, planting itself with the climber's ice-axe on the high points of the earth.

Harvard University. DANA B. DURAND.

Youssouf Kamal.—*Hallucinations scientifiques (Les portulans)*. Leiden, E. J. BRILL, 1937. ("Non mis dans le commerce.") 93 pp., 39 Plates.

In this unusual volume Prince YOUSSOUF KAMAL presents to the historians of geography a second by-product from the creation of his gigantic *Monumenta Cartographica Africae et Aegypti*. Like *Quelques éclaircissements épars sur mes Monumenta Cartographica* which was distributed in 1935, (*Isis*, 24, 453-5), *Hallucinations scientifiques* from the title page to the table of contents exhibits throughout the distinctive impress of Prince YOUSSOUF's personality.

The title, itself, is somewhat misleading. " Hallucinations " refers not to the actual portolan charts, but to certain theories and conjectures concerning their origin which modern writers have advanced. Specifically His Highness is alluding to the hypothesis (suggested, I believe, by one of the collaborators of the *Monumenta*) that the creators of the portolan charts were influenced in their delineation of the north African coast by the maps and geographical writings of the Orientals, particularly EL-BAKRI and EL-EDRISI.

It has been proposed by the advocates of this view that its validity should be tested by the accepted method of documentary comparison, —point by point examination of nomenclature and outline in the texts and maps of both the Oriental and the portolan tradition. To Prince YOUSSOUF this comparative method appears "bien aride " (15). Nevertheless in fairness to those who favor it, he has undertaken to provide all the necessary materials in the second half of his volume. A well-selected group of map sections have been reproduced, and from many of them, and from certain tables of latitudes and longitudes, the relevant nomenclature has been carefully transcribed.

For himself Prince YOUSSOUF prefers evidence of an external rather than an internal nature. To him both traditions must be seen in their historical context. The maps of EDRISI were of broad scope, enriching the traditional picture of the *œcumene* received through PTOLEMY from antiquity, with the extensive knowledge which the Moslems had acquired of their own world. Their interest was largely, but not wholly, theoretical. The portolani, on the other hand, confine themselves almost exclusively to what a navigator could find out from practical experience. To the former map-type the coastal outline was not the essential; to the latter it was. The seamen,—presumably Italian,—who carefully gathered the detail which the chart-maker pieced together, were working to satisfy a need which the sea-farers of western Islam had never felt. " Ces cartes de navigations... ne peuvent être que la représentation réelle de l'effet du besoin pressant de l'époque." (15.)

Although the demolition of the theory of an Oriental origin for the portolani is Prince YOUSSOUF's chief aim, he also presents a number of incidental observations which deserve attention. Of these, the most interesting and debatable deal with the role which the compass played both in the creation, and in the practical exploitation of the navigation charts. The Prince is vigorously opposed to those who make the compass the principal factor in their development. Like the hypothesis of Arabic origin, " c'est aussi, d'après moi et malgré toute ma modestie, une erreur non moins importante..." (15.) Even the striking network of loxodrome lines, the most characteristic feature of the portolan type,

is dismissed as of no practical aid to the navigator. They probably represented survivals of the ancient Greek wind-roses, taken over and perpetuated by the medieval chart-makers primarily to facilitate the drafting of the map.

The impression which emerges from Prince YOUSSOUF's study is one of effectively applied learning and good sense. The problem of the portolani is not, indeed, among the most important in medieval history, yet it can be generalized and extended until it becomes fairly representative of the complex questions of borrowing, of influence, of independent creation, and of development which arise in every branch of the subject. What Prince YOUSSOUF has done thus becomes of wider value. In a specific case he has shown that on some of these difficult points our ignorance is probably "incurable," and that extravagant hypotheses unsupported by facts,—"hallucinations,"—will only lead us "de l'obscurité aux ténèbres." (2.)

(Harvard University.) DANA B. DURAND.

G. H. Parker.—*Color changes of animals in relation to nervous activity.* x + 74 p., 40 figs. in text. Philadelphia, University of Pennsylvania Press, 1936. Price $ 1.50.

This is the Joseph Leidy Memorial Lecture in Science delivered at the Academy of Natural Sciences in Philadelphia by a former Jessup Student of that Academy, who had worked fifty-four years earlier at the Academy under the supervision of Doctor LEIDY. The author reviews the classic and literary references to color changes in chameleons and mullets from ARISTOTLE to SHAKESPEARE and notes in the writings of ARISTOTLE and of STARK (1830) the rise of the concept of protective coloration by adaptive changes simulating the background. JOSEPH LISTER (1858) declared that the eyes of any animal that possessed the property of changing its tint were the only channels through which the rays of light could gain access to the nervous system so as to induce changes of color in the skin, and that the cerebrospinal axis was chiefly concerned in regulating the functions of the pigment-cells. These statements give the physiological foundations upon which has been based the experimental work on animal coloration during the last half of the nineteenth century. He found that these changes are limited to few representatives of the higher animals, to the cephalopods, the crustaceans, the fishes, the amphibians, and the lizards.

The means by which color changes are brought about were studied in the cephalopods in 1819 by the Italian naturalist, SANGIOVANNI, who called the changing bodies chromatophores. BRÜCKE (1852) published his monograph on the color changes of the African chameleon, pointing

out that when cutaneous nerves were cut the denervated area of the skin made itself manifest by darkening, that is, the dark pigment in the melanophores of this area became dispersed. He expressed the natural opinion that nerves severed in this way had suffered paralysis and that the melanophores with which these nerves were connected, having been released from nervous control, lapsed into an inactive state. In this way he brought chromatophores into line with ordinary muscle fibers.

POUCHET (1872, 1876) carried out experiments upon fishes, cutting integumentary nerves and he noted that the denervated areas darkened as they had done in the chameleon. POUCHET, however, showed still further that if the spinal cord of a fish is cut, no such integumentary darkening follows. This response took place only when the sympathetic chains situated one on either side of the vertebral column were severed. He therefore declared that the chromatophoral system was not only under the control of nerves but that these nerves were sympathetic in origin.

CORONA and MORONI (1898) showed that when adrenalin, the secretion of certain cells in the medulla of the adrenal gland, was introduced into the circulation of a frog the pigment in its melanophores became strongly concentrated. REDFIELD (1918) after an exhaustive study of the color changes in Phrynosoma, expressed the opinion that the melanophores in this lizard were under the control of two types of agents, nervous and hormonal, and that both these agents in this particular instance were concerned with the concentration of the melanophoral pigment, that is, with the blanching of the animal. Here then was evidence of a novel form of chromatophoral control, one in which hormones or, as these particular hormones are now called, neurohumors, are concerned. In amphibians and crustaceans the process of nerve cutting as carried out by the older investigators had never yielded, even in the hands of the most skilful, conclusive and satisfactory results such as had been obtained from fishes and reptiles.

HOGBEN and WINTON (1922, 1923) pointed out that in European frogs nerves played a wholly insignificant part in the control of color changes in amphibians, if, in fact, they had any part at all. The dark phase of the frog was shown to depend upon a secretion derived from the pituitary gland, probably from its intermediate part. This secretion was carried from the gland by the blood to the melanophores, whose pigment was thereby induced to disperse, but the pale phase of the animal was not so consistently worked out. Subsequently HOGBEN and his associates worked upon other species of frogs and particularly upon the South African toad, Xenopus. As a result of these later investigations he and SLOME became persuaded that at least in the amphibians just named there was

evidence for a second humor which, though derived from the pituitary complex, nevertheless induced a concentration of melanophoral pigment. This humor, though also a product of the pituitary gland, was thus the counterpart of the first one.

Quite independent of the work on amphibians, but emerging eventually in much the same way, is that done by recent investigators on crustaceans. KOLLER (1925) noticed that when the blood of a dark-tinted Crangon, a common Atlantic shrimp, was drawn and injected into a pale one the latter quickly grew dark. This at once suggested that in these animals neurohumors may be in the blood and may be the means of controlling the color-cells. This humor he finally found in the eye-stalks of the shrimp.

Thus it appears that color changes may be controlled in animals through one or other of two radically different physiological systems: a direct nervous control as seen particularly in fishes and in reptiles, and a secretory or neurohumoral one as exemplified in crustaceans and amphibians.

The author then describes his own experimental work on fishes in which he further develops the concept of neurohumors. The diversity of organization in chromatophoral systems is apparent even more in the variety of neurohumors than in the types of innervations. As the author points out, it would be premature to attempt a general consideration and classification of these activators. The most that can at present be done is to divide them into the two groups of lipohumors and of hydrohumors (PARKER, 1935). In *Fundulus*, *Ameiurus*, and *Mustelus* the concentrating agents are lipohumors as are the dispersing humors in *Fundulus* and in *Ameiurus*. The ordinary hydrohumor from the pituitary gland disperses melanophoral pigment almost universally, that from the medulla of the adrenal gland, adrenin, concentrates it with still greater uniformity. The parasympathetic fibers to the vertebrate heart produce a hydrohumor, acetylcholin, that inhibits the heart muscle, and the same class of fibers in *Fundulus* produces a lipohumor that disperses melanophoral pigment. The author says when we seek for generalizations in such an array of details we find at present little beyond those associated with the two types of solubilities already discussed.

That agents like neurohumors are active in such general central functions as the transmission of nerve impulses from one neurone to another has for some time been surmised. The production of a neurohumor on one side of a synapse and its reception on the other may well be the explanation of synaptic polarization and of the appreciable loss of time in the passage of an impulse over such a junction.

In this way neurohumors may play a very significant part in nervous

operations Their occurrence as active intermediaries in the chromatophoral system is a matter of growing certainty. They also appear to have an important rôle in the excitation of smooth muscle and in the control of the vertebrate heart-muscle. It is easy to conceive of them as the effective agents in such central nervous functions as activation and inhibition just mentioned, in the relation of receptor cells to their conducting neurones, and in that large body of nervous interrelations where the integrity of nerve-units is dependent upon the so-called trophic function.

CHARLES A. KOFOID.

Joseph Schafer.—*The social history of American agriculture.* x+302 p., 2 pls., 6 figs. in text. The MACMILLAN Co., New York, 1936. (Price $2.50.)

This book is based on a series of lectures given at University College, London, on the Commonwealth Foundation by Dr. SCHAFER, Superintendent of the Wisconsin State Historical Society. In addition to the historical, social, and political aspects of American agriculture, the author discusses " big business " and professional farming as compared with the more primitive subsistence type. In these sections one finds presentations of many applications of chemistry and biology to the solution of problems of agriculture, of the state and federal agencies organized to foster scientific agriculture, and of semi-scientific publications which digested and diffused scientific information. There are discussions of LIEBIG's influence in establishing the basic aspects of agricultural chemistry and the resulting growth of interest in the relations of science to agriculture in the United States. This growth finally resulted in the Morrill Act signed by President LINCOLN in 1862 which started the movement for scientific farming, founded the Land Grant Colleges in every state of the Union and through competition with them ultimately stimulated the growth of instruction in the sciences in the older privately endowed colleges. This was followed by the Hatch Act (1877) providing annual stipends for Agricultural Experiment Stations and the later Nelson, Adams, Smith-Hughes Acts which expanded the scientific facilities and increased the personnel of both the colleges and the stations. Notes are made on farmer scientists, and comments, on the contributions of RUFFIN to the importance of calcium in fertilizers; of HARRIS, who had worked at Rothamsted, to the sciences of drainage and tillage; and of WARING, sanitary engineer who died of yellow fever at Havana in the Spanish-American War, author of *Elements of Agriculture.* The author has touched very lightly, if at all, on some of the most important scientific achievements which have profoundly modified the development of agriculture, such as the control of Texas fever of cattle, swine plague,

and trichinosis; the biological control of insect pests; the control of fungous diseases of plants; and the improvements in farm products by the use of genetics.

CHARLES A. KOFOID.

Julian Huxley.—*Africa View.* viii + 455 p., pl., map. London, CHATTO & WINDUS, 1936.

In 1929 the British Colonial Office commissioned the author to go out to East Africa and report on the progress of native education. He spent sixteen weeks visiting Uganda, Tanganyika, Kenya and Zanzibar and upon his return wrote this book which is one of the very best books of travel I have ever read. JULIAN HUXLEY being a naturalist as well as a sociologist, his account is an admirable blend of natural and human history, accurate, alert, imaginative and generous. The complexity of his mission may be judged from the following list of questions which it was his duty to answer as well as possible. The list is exemplary, not exhaustive.

"How far is the native African capable of improvement, of profiting by education? Is indirect or direct rule the better expedient? Do we intend ever to give African natives the vote? Can we free tropical Africa of malaria, sleeping sickness, plague, relapsing fever, dysentery, and the rest? Will tropical agriculture on a modern commercial scale ever succeed, ever be more than a well-accepted invitation to innumerable insects? Can the white man live in the tropics not merely as an individual but as a reproducing race? What, in the name of GALEN, *is* sunstroke? Will the black races blindly copy the white, or will they develop a new civilization of their own? To federate, or not to federate? Is Christianity a good religion for the African? Is Africa in for another period of the violent geological disturbances which thrust the rift escarpments one, two, and three thousand feet above the rift floors? Should we aim at making English or Swahili the *lingua franca* of out East African colonies? Who were the prehistoric inhabitants of tropical Africa, what the series of events by which the present tribes reached their existing stations? Will game and game reserves continue to exist on the grand scale, or must they dwindle and disappear before modern firearms and the white man's economic greed? Can the native succeed in ousting the Asiatic from his entrenched position in the economic system of East Africa? Will the different powers among whom Africa is divided ever meet to discuss over a friendly table means for assimilating their diverse systems of treating subject races?" (p. 7)

This great book — which will remain I believe a classic in its field — is a credit not only to the author, but to England, whose colonial policies are *at present* remarkably humane and intelligent.

I shall not attempt to summarize the book, for no summary could do it justice. It is a book to read and to ponder over. The problems of native education and of the conflict between an original culture and our own are singularly interesting for the historian of science, for they help

him to appreciate similar conflicts as they occurred in the past, for example, when Western Europe was in the same relationship to the sophisticated lands of the Near East, as Tanganyika is to England to-day. The following passage is an additional illustration of the pertinency of this book from the point of view of our readers, and of the author's well earned right to their consideration :

"We can try to avoid fixing the shackles of past custom or present prejudice on to a new civilization; but we cannot anticipate the future, or go beyond the enlightened thought of our own time for guidance. If I were asked to sum up in a phrase the main trend of post-War thought, I would say that, in so far as it was not merely pessimistic or destructive, it was in the direction of science tempered by humanism. Theology was queen of the sciences in mediaeval times; but this pre-eminence of religion came to an end with the Renaissance, and the distinction between sacred and secular emerged sharply in practice and ideas. Then science grew up within secularity; and a new orientation revealed itself. Science appeared as an independent menace both to religion and to secular humanism, while these had by no means reconciled their antagonism of worldly versus other-worldly. But the very triumphs of science recast the parts again. The greatest burst of new activity is now in the human and social sciences, not in natural science; and our main search now is not merely for new scientific achievements, but also for a scale of values. The aim of any humanism can, I suppose, be summed up as *more life*. This modern brand of humanism is distinguished by the place which it allots to science. It sees in science, its method, its results, and its general outlook, the only means for realizing its aim, in matters of social organization or systems of government as much as in the control of nature. But its aims and values are humanistic, and it does not intend to let these be controlled by science, any more than by any other sort of intellectualism, or by theology, patriotic ambition, or commercialism. You will not want what you ought to want without the humanistic spirit; you will not get what you do want without the scientific spirit." (p. 434)

Africa View is adorned with a number of well chosen photographs and in the frontispiece with DORA CLARKE's very beautiful interpretation of a Kikuyu girl.

GEORGE SARTON.

Factors determining human behaviour.—Harvard Tercentenary Publications. Cambridge : Harvard University Press, 1937. vii+168 pp. $2.50.

Authority and the individual.—Harvard Tercentenary Publications. Cambridge : Harvard University Press, 1937. vii+371 pp. $3.00.

These volumes report two of the symposia which constituted the Harvard Tercentenary Conference. The first of these includes the papers of an English physiologist, a Canadian biochemist, three psychologists, German, French and Swiss, an American political scientist, a

Czech logician and a Polish anthropologist who met to discuss the factors conditioning human behavior.

Despite the wide range of materials dealt with in these essays, despite the diversity of conceptual schemes which are introduced, there emerges a largely consistent interpretation of human behavior. It may well be that it is still impossible to translate the terms of one analytical scheme into those of another, but the implications of the several analyses are even now seen to be, in many respects, mutually supporting.

One striking convergence of this sort is found in the general agreement upon the dominant importance of the non-logical elements in human conduct. As Professor ADRIAN's paper on "The Nervous System" indicates, the very basis of such rational activity as problem-solving requires a sustained interest, "a prospect of reward or punishment, an emotional stress which will change to satisfaction when the lesson is learnt or the problem solved." Professor CARNAP formulates the general problem and calls upon psychology and the social sciences to locate the non-logical sources of both logical and illogical thought. President LOWELL's case-study of the development of the British parliamentary system suggests that a social institution, far from being the enactment of a clearly formulated plan, may arise as the unanticipated outcome of collective adjustments to immediate contingencies. This specific case may be examined in terms of SUMNER's analysis of 'crescive' (as distinct from 'enacted') institutions, or as an instance of that type of non-logical behavior where the further consequences do not coincide with the subjective end.

A second strain which runs through most of the papers in the first symposium concerns the far reaching extent to which action deriving from sentiment is rationalized and rendered presumably logical. PARETO has denoted this prevalent pattern by the phrase, 'need for logic.' The recognition of this tendency requires the distinction between three analytically separable elements in human behavior: motives (which may or may not find adequate expression in rationalizations), functions (the objective results of the action as witnessed by the scientific observer), and 'causes' (the factors, largely non-logical, which may be thought of as the source of both the overt and the linguistic behavior). Thus, Professor MALINOWSKI, in his functionalist interpretation of culture, indicates that magic leads to mental integration, to optimism and confidence in the face of danger as well as to social organization when "organized and effective action is of supreme importance." This function is quite different from the myth or 'explanation' of magic which is furnished by the magician and members of the community. In this essay, however, MALINOWSKI does not deal systematically with

the third element in the situation, the sentiments which give rise to both the myth and the ritual.

Still another point of view which is common to virtually all of these discussions holds that logical thought, far from being a normal, continuous practice, is rather an intermittent response to unusual obstacles to action. The sole exception to this is found in the institution of science. In connection with this general question, Professor PIAGET indicates on the basis of his notable observations of the intellectual development of the child, that social interaction leads to the gradual elimination of egocentricity and solipsism, since such interaction teaches the child that his perspective is not absolute but relative and that it must be coordinated with the perspectives of others. PIAGET's materials and interpretation are suggestive for a study of the influence of social factors in the historical development of science, without requiring the gratuitous assumption that the development of the child recapitulates that of the race.

Much the same general conceptions underly the discussions in the second volume. Professor WESLEY MITCHELL's view of economic planning might be summarized by the phrase that the economic " expert should be on tap, but not on top;" since it is not the function of the social scientist to set up ends, but only to trace functional relationship between social processes and thus to elucidate the most effective means of attaining these ends. Professors COPLAND and ROBERTSON join in the warning that attention cannot be confined to the *direct* effects of planning, since the measures must be introduced into a complex social situation where the further consequences may be of far greater importance.

The diversity of topics which are treated in these volumes precludes the possibility of brief summarization. It may fairly be said, however, that these essays furnish some basis for holding that the recent developments in social science are far more integrated and consistent than is commonly recognized. Analyses drawn from various sectors of social science are largely complementary; the body of generally accepted theory is growing. At least one of the functions of these symposia is to provide further assurance that the social sciences are beginning to approximate the attainments of their elder siblings, the physical and biological disciplines.

Contents of volume I : E. D. ADRIAN : The nervous system; J. B. COLLIP : Hormones in relation to human behavior; J. PIAGET : Principal factors determining intellectual evolution from childhood to adult life; C. G. JUNG : Psychological factors determining human behavior; P. JANET : Psychological strength and weakness in mental diseases; R. CARNAP : Logic; A. L. LOWELL : An example

from the evidence of history; B. MALINOWSKI : Culture as a determinant of behavior.

Contents of volume II : W. C. MITCHELL : Intelligence and the guidance of economic evolution; D. H. ROBERTSON : The state and economic fluctuation; D. B. COPLAND : The state and the entrepreneur; W. E. RAPPARD : Economic nationalism; J. H. CLAPHAM : Conservative factors in recent British history; R. M. MACIVER : The historical pattern of social change; C. M. ANDREWS : Conservative factors in early colonial history; J. DEWEY : Authority and social change; E. S. CORWIN : The constitution as instrument and as symbol; H. KELSEN : Centralization and decentralization; W. JAEGER : The problem of authority and the crisis of the Greek spirit; C. GINI : Authority and the individual during the different stages of the evolution of nations; F. MEINECKE : Klassizismus, Romantizismus und historisches Denken im 18. Jahrhundert; P. HAZARD : Un romantique de 1730, l'abbé PRÉVOST; H. M. JONES : The drift to liberalism in the American eighteenth century; E. J. DENT : The historical approach to music.

Harvard University ROBERT K. MERTON

Fifty-first Critical Bibliography

of the

History and Philosophy of Science and of the History of Civilization

(to end of July 1937—with special reference to mechanics, astronomy and physics)

This fifty-first Bibliography contains about 945 items of which 64 deal with mechanics, astronomy and physics. They have been kindly contributed by the fourteen following scholars belonging to six different countries :

C. W. ADAMS (Hertford, England)
M. F. ASHLEY-MONTAGU (New York.)
T. L. DAVIS (Cambridge, Mass.)
M. GRAVES (Washington, D.C.)
L. GUINET (Brussels)
C. A. KOFOID (Berkeley, Cal.)
C. D. LEAKE (San Francisco)
L. LEROUX (Paris)
J. PELSENEER (Brussels)
A. POGO (Washington, D.C.)
H. RENAUD (Rabat, Morocco)
G. SARTON (Cambr., Mass.)
P. SERGESCU (Cluj)
E. WICKERSHEIMER (Strasbourg).

This Bibliography includes as usual a series of addenda and errata to SARTON's *Introduction to the History of Science*, vols. 1 and 2 (Baltimore and London, 1927 and 1931). Its purpose and methods have been explained in the preface to the 38th Critical Bibliography (*Isis* 20, 506-08).

I have in my drawers a large number of notes which I will be glad to publish as soon as I have been able to check them upon the originals.

I entreat the authors of relevant books and papers to send me copies of them *as promptly as possible* in order that their studies may be registered in this bibliography and eventually reviewed and discussed. By so doing they will not simply help me and every other historian of science but they will help themselves in the best manner, for they will obtain for their work the most valuable publicity and its certain incorporation into the literature of the subject.

Many of the notes were checked and the final manuscript and proofs of this Critical Bibliography were kindly read by Dr. M. C. WELBORN.

Harvard Library, 185
Cambridge, Mass.

GEORGE SARTON.
August 13, 1937.

PART I

FUNDAMENTAL CLASSIFICATION (CENTURIAL)

Vth Century B.C.

Bidez, J. A propos des "Perses" d'ESCHYLE. *Bulletin de l'Académie royale de Belgique* (classe des lettres), séance publique du 5 mai 1937, p. 206-35. ISIS

Democritos. Fragments and testimonials of antiquity. Edited, with commentaries, by G. K. BAMMEL. 382 p. Moscow, *OGIZ*, 1935 (in Russian). ISIS

Reviewed by A. P., *Isis* 26, 456-57, 1937.

Nilsson, Martin P. Reflexe von dem Durchbruch des Individualismus in der griechischen Religion um die Wende des 5. und 4. Jhts. v. Chr. *Mélanges Franz Cumont*, 365-72, 1936. ISIS

Schlichting, Th. H. De hippocratische behandeling van inwendige ziekten. *Bijdragen tot de geschiedenis der geneeskunde* 17, 73-81, 1937. ISIS

IVth Century B.C. (whole and first half)

Places, Edouard des. PLATON et l'astronomie chaldéenne. *Mélanges Franz Cumont*, p. 129-42, 1936. ISIS

"Après avoir rappelé les prédispositions de PLATON à une influence orientale, puis suivi les traces de cette influence dans son œuvre et montré, de ce point de vue, l'unité de sa pensée, nous nous sommes trouvé en présence d'un document qui se donne pour le testament spirituel du chef de l'Académie et qui, en même temps, est une profession de foi en la religion astrale. Si l'*Epinomis* n'est pas de PLATON, la question posée dans cet article, celle des rapports de PLATON avec l'astrolâtrie chaldéenne, n'admet qu'une réponse hypothétique. Nous avons, au contraire, essayé d'établir que la théologie sidérale de l'*Epinomis* prolonge l'évolution attestée par les *Lois*, et que, si l'authenticité du dialogue apparaît d'ailleurs soutenable, ce dialogue constitue le plus clair témoignage de l'influence que la religion des Chaldéens a pu exercer sur les dernières années de PLATON."

Thieme, Paul. Pāṇini and the Veda : studies in the early history

of linguistic science in India. XV+132 p. Allahabad, Globe Press, 1935. ISIS

Elaborate review by L. RENOU, *Journal asiatique* 228, 333-40, 1936 (received May 1937).

IVth Century B.C. (second half)

Einarson, Benedict. ARISTOTLE's *Protrepticus* and the structure of the *Epinomis*. *Transactions of the American philological association* 67, 261-85, 1936. ISIS

" The *Epinomis* is a discussion of the content of *σοφία* resembling the second part of the protreptic in PLATO's *Euthydemus* and the plan laid down in the first book of ARISTOTLE's *Metaphysics*. With the help of the polemic against ISOCRATES contained in the *Protrepticus* of ARISTOTLE and *Metaphysics* A and its reflection in the *Epinomis* it is shown that the *Protrepticus* and probably the *Περὶ φιλοσοφίας* of ARISTOTLE influenced the *Epinomis* in its formulation and treatment of the problem discussed. The result is an elucidation of heretofore obscure passages in the *Epinomis* and new evidence for its unauthenticity."

Keyser, Cassius Jackson. The role of infinity in the cosmology of EPICURUS. *Scripta mathematica* 4, 221-40, 2 pl., 1937. ISIS

Senn, G. Die Entwicklung der biologischen Forschungsmethode in der Antike und ihre grundsätzliche Förderung durch THEOPHRAST VON ERESOS. 262 p., port. Aarau, SAUERLÄNDER, 1933. ISIS

Reviewed by C. A. KOFOID, *Isis* 27, 68-9, 1937.

Torrey, Harry Beal ; Felin, Frances. Was ARISTOTLE an evolutionist? *The quarterly review of biology* 12, 1-18, 1937. ISIS

Careful analysis in which the conclusion is reached that ARISTOTLE wasn't either a cosmic or a racial evolutionist. The scope of the sixty-five references to the article indicate the care with which the study was made. C. D. L.

IIIrd Century B.C. (whole and first half)

Leroy, Maurice. La traduction arménienne d'EUCLIDE. *Mélanges Franz Cumont*, p. 785-861, 1936. ISIS

" L'idée de la présente publication nous a été suggérée par M. le Professeur M.-A. KUGENER qui, s'intéressant à l'histoire du texte euclidéen et ayant appris par M. N. ADONTZ l'existence d'un fragment de version arménienne de ce texte, nous en demanda, voici deux ans, une traduction. C'est d'ailleurs à ce propos que, nous étant mis à l'étude de la lettre où GRÉGOIRE MAGISTROS,

prince de l'esprit autant que grand seigneur entretient son ami SARGIS de ses lectures et de ses travaux personnels — parmi lesquels prend place une traduction d'EUCLIDE — le commentaire de cette lettre nous fournit le sujet d'une autre étude. Depuis, lors d'un passage à Pavie, nous eûmes l'occasion de collationner ces précieux restes de la version arménienne d'EUCLIDE et c'est sur cette base nouvelle que nous rééditons aujourd'hui ce petit texte qui forme un chapitre intéressant de l'histoire des sciences." Édition du texte arménien avec traduction latine et notes. Le texte arménien peut dater du temps de GRÉGOIRE MAGISTROS (XI-1) ou lui être antérieur. Le MS. de Pavie ne paraît guère antérieur au XV^{e} siècle. G. S.

IIIrd Century B.C. (second half)

(Tannery, Paul). Sur l'histoire de la pression hydrostatique. Note inédite de PAUL TANNERY. *Archeion* 19, 67-9, 1937. ISIS

Ist Century B.C. (whole and first half)

Drabkin, Israel E. Notes on LUCRETIUS II. 479-82. *Classical philology* 32, 258-63, 1937. ISIS

Edelstein, Ludwig. The philosophical system of POSIDONIUS. *American journal of philology* 57, 286-325, 1936. ISIS

"The interpretation of the Posidonian philosophy changed a good deal with the modification of the method of reconstruction. First, the system was visualized as a Stoic theory influenced more or less by PLATO and ARISTOTLE. POSIDONIUS was believed to be an eclectic thinker of not too great importance and individuality. But when the new method of tracing down the influences was introduced, the Posidonian philosophy was regarded as the starting point of Neoplatonism. POSIDONIUS passed for a religious thinker, for the first to connect Oriental and Greek thought. Almost all Greek philosophy of later centuries was based on his work. Finally, POSIDONIUS was characterized as a philosopher whose system is founded on sciences. To him spirit and nature were only two different aspects of the same power; he was a monistic thinker, the first vitalist of antiquity. POSIDONIUS was now considered to be the last Greek philosopher before the beginning of that epoch during which Greek and Oriental thought were united. These three conceptions of Posidonian philosophy stand in opposition to one another. Which of them really represents his system? At the moment, this question cannot be answered."... "It is my aim to attempt the reconstruction of the philosophical system by interpreting the fragments alone, I shall presume only that POSIDONIUS was a Stoic philosopher, deeply influenced like his teacher PANAETIUS by Platonic and Aristotelian theories. So much is certain. In order to understand the scattered and abbreviated testimonies, it is necessary, therefore, and advantageous to correlate them to the general Stoic theory as well as sometimes to the philosophy of PLATO and ARISTOTLE."

Sikes, E. E. LUCRETIUS poet and philosopher. IX+187 p. Cambridge, University Press, 1936. ISIS

Reviewed by M. F. ASHLEY-MONTAGU, *Isis* 27, 70-2, 1937.

1st Century B.C. (second half)

Jones, Leslie Webber. More about the London Vitruvius. *Speculum* 12, 257-63, 1937. ISIS

1st Century (whole and first half)

Carruccio, Ettore. Note sul poema astronomico ed astrologico di MANILIO. *Archeion* 18, 330-49, 1 fig., 1936 (received 1937). ISIS

1st Century (second half)

Bickermann, E. Sur la version vieux-russe de FLAVIUS-JOSÈPHE. *Mélanges Franz Cumont*, p. 53-84, 1936. ISIS

Ekholm, Gunnar. Zur Tacitusforschung. *Lychnos* 2, 236-42, Uppsala 1937 (in Swedish with German summary). ISIS

Hulme, E. Wyndham. Iron-smelting with lake- and bog-iron ores. *Antiquity* 11, 221, 1937. ISIS

Footnote to PLINY. G. S.

Krause, Max. Die Sphärik von MENELAOS aus Alexandrien in der Verbesserung von ABŪ NAṢR MANṢŪR B. 'ALĪ B. 'IRĀQ. Mit Untersuchungen zur Geschichte des Textes bei den islamischen Mathematikern. VII+255 p.+110 p. Arab. (Abhandlungen der Gesellschaft der Wissenschaften zu Göttingen, philologisch-historische Kl. Nr. 17). Berlin, WEIDMANN, 1936. ISIS

" Die MENELAOS-Forschung fusste bisher fast ausschliesslich auf den lateinischen Übersetzungen, die teils direkt, teils über das Hebräische aus dem Arabischen geflossen waren, während die für uns — da der griechische Urtextverloren gegangen ist — primären Quellen — nämlich die arabischen Übersetzungen, bearbeitungen und Verbesserungen — entweder überhaupt nicht oder doch nur teilweise berücksichtigt wurden. Diese Lücke will meine Arbeit ausfüllen helfen. Sie ist rein philologischer Natur, wenn ihr auch ein mathematischer Text zugrunde liegt. Mir schwebten zwei Ziele vor : einmal wollte ich die arabische Ausgabe zugänglich machen, die der besten arabischen Übersetzung am nächsten steht (denn von dieser

Übersetzung selbst hat sich bisher noch keine Handschrift gefunden), und dann wollte ich das Verhältnis der verschiedenen arabischen Ausgaben und Verbesserungen zu einander klären und alles für die Mathematik-Geschichte wichtige Material zusammenstellen. ... Diesen beiden Zielen entsprechen die beiden Teile meiner Arbeit : I. Zur Textgeschichte der Sphärik (selbstverständlich nur bei den islamischen Mathematikern) und II. Edition der Sphärik in der Verbesserung von ABŪ NAṢR MANṢŪR B. 'ALI."

Ussani, Vincenzo. I miei Studi su FLAVIO GIUSEPPE e alcune Osservazioni su Gesù nel GIUSEPPE SLAVO. *Mélanges Franz Cumont*, p. 455-62, 1936. ISIS

IInd **Century** (second half)

Brunn, Walther v. Darf man GALENOS " CLAUDIUS " nennen? *Ciba Zeitschrift* nr. 43, 1 p., 1937. ISIS

Pfister, R. Nouveaux textiles de Palmyre. Découverts par le service des antiquités du Haut-Commissariat de la République française dans la nécropole de Palmyre (tour d'Élahbel). 56 p., 9 pl. Paris, Les éditions d'art et d'histoire, 1937. ISIS

Nous avons déjà signalé d'importantes études du même auteur sur les textiles anciens : (1) *Textiles de Palmyre*, (Paris, 1934; *Isis* 25, 184); (2) *Teinture et alchimie dans l'Orient hellénistique* (Prague, 1935; *Isis* 25, 250); (3) *Textiles égyptiens post-islamiques* (Paris, 1936; *Isis* 27, 150). Le présent mémoire est une continuation du premier; les détails en sont trop techniques pour être discutés ici, mais il vaut la peine de citer quelques conclusions (p. 47) :

" Il est certain qu'à l'époque de Palmyre et jusque vers la fin du III[e] siècle, la Syrie ne possédait pas le métier à la tire et ne savait donc pas tisser mécaniquement des sujets qui se répètent, lorsqu'ils présentent une certaine importance. D'autre part, la Syrie, d'après les échantillons que nous avons sous les yeux, n'avait pas beaucoup de goût pour les polychromies violentes qu'aimera l'Egypte copte. Lorsqu'à Palmyre plusieurs couleurs sont juxtaposées elles forment des ensembles d'une tonalité riche mais sobre." ... " Plus tard, lorsque l'influence sassanide se fait sentir dans les sujets, les coloris qu'elle fait dominer sont tout différents de ceux de Palmyre. On doit sans doute en conclure que ces derniers ne représentent nullement le génie iranien et qu'ils sont proprement syriens et, en particulier, palmyréniens. Le contraste entre les décorations sassanides d'Egypte et les colorations de Palmyre est frappant, mais les spécimens de Palmyre sont en trop petit nombre pour qu'on puisse généraliser. En ce qui concerne le choix des laines et des colorants précieux, le luxe est poussé à Palmyre beaucoup plus loin que jamais en Egypte copte; la technique aussi dans sa perfection, s'apparente beaucoup plus à celle de l'Egypte pharaonique qu'aux procédés très peu variés de l'époque copte. L'emploi de la serge, que nous avons vu utiliser dans des combinaisons savantes, semble être une

spécialité de la Syrie. Les très rares tissus de laine unie, décorés par des losanges en serge, qui ont été découverts en Egypte, doivent être de provenance syrienne. Nous avions, en 1934, décrit de beaux damas chinois, dont un, notamment, était orné de dragons affrontés. Des tissus de ce genre ont dû être en vogue à la Cour byzantine encore vers la fin du IVe siècle puisque Saint JEAN CHRYSOSTOME dans son sermon sur la charité parfaite, prête à l'empereur THÉODOSE une robe de soie où étaient représentés des dragons. A cette époque, en effet, l'Occident ne savait pas encore tisser des sujets de cette importance; la Perse qui était plus avancée a bien utilisé le dragon pour décorer des vêtements, mais il semble plus normal de penser ici à une étoffe chinoise analogue peut-être à celle que nous avons décrite en 1934. Nous avions proposé de chercher en Syrie l'origine du vêtement copte (*Mélanges Linossier*, 1932, p. 455); la sobriété des coloris coptes à ses débuts — pourpre sur lin — serait un argument de plus en faveur de cette filiation. C'est seulement plus tard que, d'abord par l'addition de quelques accents jaunes, rouges ou verts au décor de couleur pourpre l'Egypte s'est émancipée de la tradition syrienne." G. S.

Walsh, Joseph. GALEN's writings and influences inspiring them. *Annals of medical history* 6, 1-30, 8 fig., 143-49, 1934; 7, 428-37, 570-89, 9 fig., 1935; 8, 65-90, 1936; 9, 34-61, 6 fig., 1937. ISIS

Witt, R. E. ALBINUS and the history of middle Platonism. XII+147 p. Cambridge University Press, 1937 (7s. 6d). ISIS

Up to the end of the 18th century the *Didaskalikos* of ALBINUS ("ALKINOOS") was held in great repute as an exposition of the Platonic philosophy, to-day the work is virtually completely forgotten. Yet, as Dr. WITT succeeds in showing in the present volume, the *Didaskalikos* is of importance in tracing the history of Middle Platonism and in discovering how the Platonic picture appeared to a writer who was separated from PLATO by a period of some five hundred years. Never before has the *Didaskalikos* been so exhaustively and carefully studied as by Dr. WITT. The work, a typical product of Middle Platonism, is examined in its relations to the relevant philosophies of the pre-Christian era and to the neo-Platonism of PLOTINUS. Dr. WITT has done his work exceedingly well, and it is only to be regretted that the emended text of the *Didaskalikos*, information about manuscripts and editions, etc., prepared by the author could not be included in the present volume because of considerations of space. M. F. A.-M.

IIIrd Century (whole and first half)

Coutant, Victor Carlisle Barr. ALEXANDER OF APHROSDISIAS: Commentary on book IV of ARISTOTLE's *Meteorologica*. Translated into English with introduction and notes. Dissertation for the degree

of Doctor of Philosophy, Columbia University. 99 p. New York City, 1936. ISIS

Introduction (p. 7-31) discussing the *Meteorologica* and ALEXANDER's commentary. English version of an extract from Book III and of Book IV. G. S.

Faye, Eugène de. ORIGÈNE. Sa biographie et ses écrits. 243 p. Paris, LEROUX, 1937. ISIS

IIIrd Century (second half)

Henning, W. Ein manichäisches Bet- und Beichtbuch. 141 p. (Abhandlungen der Preussischen Akademie der Wissenschaften, Jahrgang 1936, philosophisch-historische Klasse, 10). Berlin, Akademie der Wissenschaften, 1937. ISIS

Heuten, G. Le " soleil " de PORPHYRE. *Mélanges Franz Cumont*, 253-59, 1936. ISIS

" Une note de SERVIUS sur les *Bucoliques* fait connaître l'existence d'un traité de PORPHYRE ' *quem Solem appellavit*,' et donne en même temps un important aperçu de son contenu en disant qu'on y pouvait trouver la démonstration de la multiplicité de la personne d'APOLLON. Ce dieu en effet ne serait pas unique, mais il s'appellerait à la fois Sol dans le ciel, Liber pater sur la terre, et APOLLON dans les enfers. Une argumentation archéologique, tirée sans doute elle aussi de l'ouvrage de PORPHYRE, venait appuyer cette thèse."

IVth Century (second half)

Bouchery, Herman F. THEMISTIUS in LIBANIUS' brieven. Critische uitgave van 52 brieven, voorzien van een historisch commentaar en tekstverklarende nota's met een voorrede van J. BIDEZ. 295 p. (Rijksuniversiteit te Gent, werken uitgegeven door de Faculteit van de wijsbegeerte en letteren, 78). Antwerp, DE SIKKEL, 1936. ISIS

Simon, M. La polémique anti-juive de S. JEAN CHRYSOSTOME et le mouvement judaïsant d'Antioche. *Mélanges Franz Cumont*, p. 403-21, 1936. ISIS

" Nous possédons de S. JEAN CHRYSOSTOME huit homélies *contre les Juifs*. Prononcées à Antioche, en 386 et 387, selon les attributions les plus vraisemblables, l'année même de l'ordination sacerdotale de CHRYSOSTOME et l'année suivante, elles constituent un cycle fermé et représentent dans l'histoire de la polémique engagée par l'Église chrétienne contre le judaïsme un moment fort important."

Vth Century (whole and first half)

Van de Woestijne, Paul. Rvtilivs Clavdivs Namatianvs *De reditv svo.* Edition critique. 103 p. (Rijksuniversiteit te Gent, Werken uitgegeven door de Faculteit van de wijsbegeerte en letteren, 76). Antwerp, De Sikkel (no date, received in 1937). ISIS

Vth Century (second half)

Bidez, J. Proclus *Περὶ τῆς ἱερατικῆς τέχνης. Mélanges Franz Cumont*, Annuaire de l'Institut de philologie et d'histoire orientales et slaves 4, 85-100, 1936. ISIS

VIIth Century (whole and first half)

Charles, Henri. Le Christianisme des Arabes nomades sur le limes et dans le désert Syro-Mésopotamien aux alentours de l'Hégire. 114 p. (*Bibliothèque de l'Ecole des Hautes Etudes*, 52). Paris, Leroux, 1936. ISIS

Jeffery, Arthur. Materials for the history of the text of the *Qur'ān*, the old codices, the *Kitāb al-maṣāḥif* of Ibn abī Dāwūd together with a collection of the variant readings from the codices of Ibn Mas'ūd, Ubai, 'Alī, Ibn 'Abbās, Anas, Abū Mūsā and other early Qur'ānic authorities which present a type of text anterior to that of the canonical text of 'Uthmān. xii+362+224 (Arabic text) p. Leiden, Brill, 1937. ISIS

Pippon, Toni. Shôtoku Taishi jû Shichi jô Kempô. Die 17 verfassungsartikel Shôtoku Taishi's und eine japanische Interpretation. Paul Kahle Festschrift, p. 201-10, Leiden, Brill, 1935. ISIS

VIIIth Century (whole and first half)

Schreiber, Heinrich. Beda in buchgeschichtlicher Betrachtung. *Zentralblatt für Bibliothekswesen* 53, 625-52, 1936. ISIS

VIIIth Century (second half)

Johnson, Rozelle P. Some continental manuscripts of the *Mappae clavicula*. *Speculum* 12, 84-103, 1937. ISIS

Puech, Henri-Charles. Fragments retrouvés de l'"Apocalypse d'Allogène." *Mélanges Franz Cumont*, p. 935-62, 1936. ISIS

" La XI[e] partie du *Livre des Scholies (Ktaḇa d'eskôlyôn)* de THÉODORE BAR KŌNAÏ, de Kaškar (vers 791-792), présente un intérêt considérable pour l'histoire ancienne des hérésies. Là où l'auteur ne se contente pas de traduire les brefs résumés de l'*Anacephalaiosis* du *Panarion* d'EPIPHANE, ou de retranscrire une médiocre traduction syriaque du même ouvrage, il reproduit, sous forme de citations choisies parmi les plus propres à ridiculiser l'adversaire par leur bizarrerie, des documents originaux qu'il paraît connaître de première main et dont le bon aloi a déjà été prouvé." " Dans cette simple note, je voudrais attirer l'attention sur une notice, jusqu'ici négligée, de cette XI[e] partie et esquisser la preuve que BAR KŌNAÏ nous y a conservé les fragments d'une apocalypse gnostique dont le titre nous était connu par ailleurs et qui remonte au moins au début du III[e] siècle."

IXth Century (whole and first half)

Sbath, Paul. Le livre des temps d'IBN MASSAWAÏH, médecin chrétien célèbre décédé en 857. Ouvrage annoté et publié pour la première fois. Extrait du *Bulletin de l'Institut d'Egypte* 15, 235-60, Le Caire, 1933. ISIS

Le *Kitāb al-azminat*, ici publié pour la première fois, n'est pas mentionné par BROCKELMANN parmi les œuvres d'IBN MASSAWAIH (MESUÉ MAJOR, *Introd.* 1, 574) — du moins pas dans sa première édition (1, 232) mais bien dans le supplément (p. 416, 1936) pour lequel il a pu utiliser le catalogue de la bibliothèque SBATH (*Isis* 13, 530).

Le " Livre des temps " est un recueil astrologique et médical des quatre saisons et des douze mois de l'année " Comme aucun ouvrage d'IBN MASSAWAIH n'a été publié jusqu'à présent, il me paraît intéressant de vous entretenir du susdit traité qui est mentionné par IBN ABI OSSAIBIA à la page 183, t. I de son " Histoire des médecins." Je possède, depuis quelques années, deux manuscrits de ce traité (*Bibliothèque de manuscrits Paul Sbath*, n° 74 : 2 et 799). Un heureux hasard m'a permis d'en acquérir un troisième beaucoup plus ancien et qui m'a facilité la reconstitution du texte original. L'authenticité de cet ouvrage ne peut être prouvée d'une manière absolue. Toutefois les idées exprimées par l'auteur correspondent à celles qui prédominaient à l'époque d'IBN MASSAWAIH, époque où les chrétiens du proche Orient étaient en contact littéraire, scientifique et religieux avec les musulmans de Bagdad avides de s'approprier les sciences grecques." Le texte arabe remplit 19 pages. Son importance scientifique paraît assez faible. G. S.

Sbath, Paul. Les axiomes médicaux de YOHANNA BEN MASSAWAIH célèbre médecin chrétien décédé en 857. Ouvrage publié pour la première fois, avec des corrections et des annotations. 34+VII p. Le Caire, Imp. " Au prix coûtant," 7, rue el-Sabb, 1934. ISIS

Cet ouvrage inédit de MESUÉ l'ancien (*Intr.* 1, 574) *Al-nawadir al-ṭibbiyat* contient une série de 132 axiomes médicaux. Il est ici publié en entier

(27 p.) mais non traduit. Il serait intéressant de comparer ces aphorismes à ceux d'HIPPOCRATE et de MAIMONIDE. En voici quelques exemples : 1. " La vérité en médecine est un but inaccessible, et le traitement d'après les prescriptions des livres sans l'avis d'un médecin habile est dangereux." 13. " Le médecin doit toujours inspirer au malade l'idée de la santé et la lui faire espérer, même s'il n'est pas sûr de la guérison, car le tempérament du corps suit le penchant de l'âme." 49. " Ceux qui s'adonnent aux exercices forcés doivent se reposer un peu avant les repas, et ceux qui jouissent du repos doivent faire un peu d'exercice avant les repas." G. S.

IXth Century (second half)

Baudoux, Claire. Un édition polyglotte orientale des éléments d'EUCLIDE : la version arabe d'ISḤĀQ et ses dérivées. *Archeion* 19, 70-1, 1937. ISIS

Goitein, S. D. F. The *Ansāb al-ashrāf* of AL-BALĀDHURĪ, published for the first time by the school of oriental studies, Hebrew University, Jerusalem. Vol. 5 in 2 parts. 32 p., in English +440 p. in Arabic +27 p. in Hebrew; VI+88 p. in English. Jerusalem, University Press, 1936. ISIS

Reviewed by GEORGE SARTON, *Isis* 26, 457-58, 1937.

Xth Century (whole and first half)

Davidson, Israel. The book of the wars of the Lord, containing the polemics of the Karaite SALMON BEN YERUHIM against SAADIAH GAON. XIV+132 p. New York, Jewish theological seminary of America, 1934. ISIS

Reviewed by LEON NEMOY, *Jewish quarterly review* 28, 91-4, 1937.

Xth Century (second half)

Krause, Max. Die Sphärik von MENELAOS aus Alexandrien in der Verbesserung von ABŪ NAṢR MANṢŪR B. 'ALĪ B. 'IRĀQ. Mit Untersuchungen zur Geschichte des Textes bei den islamischen Mathematikern. VII+255 p.+110 p. Arab. (Abhandlungen der Gesellschaft der Wissenschaften zu Göttingen, philologisch-historische Kl. Nr. 17). Berlin, WEIDMANN, 1936. ISIS

See note in section I(2).

Wood, Casey A. Memorandum book of a tenth-century oculist. For

the use of modern ophthalmologists. A translation of the *Tadhkirat* of ALI IBN ISA of Baghdad (cir. 940-1010 A.D.), the most complete, practical and original of all the early textbooks on the eye and its diseases. XXXIX+232 p., 18 ill. Chicago, Northwestern Univ., 1936. ISIS

Reviewed by MAX MEYERHOF, *Isis* 27, 72-5, 1937.

XIth Century (whole and first half)

Farmer, Henry George. The lute scale of AVICENNA. *Journal of the Royal Asiatic Society*, 245-57, 1937. ISIS

Meyerhof, Max. The history of trachoma treatment in antiquity and during the Arabic Middle Ages. *Bulletin of the ophthalmological society of Egypt* 29, 48 p., 5 pl.+14 p. in Arabic, Cairo, 1936. ISIS

It will suffice to indicate the availability of this monograph prepared by one doubly well qualified to write it, as a master ophthalmologist and as a master historian. It includes the Arabic text (first edition !) and an English translation of the sections concerning trachoma in the *Tadhkirat al-kaḥḥālīn* of 'ALĪ IBN 'ISĀ (XI-1; *Introd.*, I, 731). The translation is different from the one recently published by CASEY A. WOOD (Chicago, 1936; *Isis* 27, 72-5), but the author has sometimes taken advantage of it. When will we be given a complete Arabic edition of the *Tadhkirat?* Dr. MEYERHOF would be the man to prepare it. G. S.

Meyerhof, Max; Schacht, Joseph. Une controverse médico-philosophique au Caire en 441 de l'hégire (1050 ap. J.-C.) Avec un aperçu sur les études grecques dans l'Islam. *Bulletin de l'Institut d'Egypte* 19, 29-43, 1937. ISIS

" Dans une étude parue dans le *Bulletin* de notre Institut, l'un de nous a tracé une esquisse du transfert des sciences grecques d'Alexandrie au centre de l'empire des califes (1933). A cette occasion nous avons mentionné certains ouvrages du savant médecin arabe-égyptien 'ALI IBN RIḌWĀN et sa polémique avec le médecin IBN BUṬLĀN de Baghdād. Depuis ce temps il nous a été possible de repérer un manuscrit de cette fameuse controverse —dont quelques fragments ont été insérés par IBN AL-QIFṬĪ dans son Histoire des savants — dans le catalogue des manuscrits de Mossoul édité par le Dr. DĀWŪD AL-ČALABĪ. Grâce à l'obligeance de ce savant nous avons pu obtenir une photographie de ce précieux manuscrit dont nous comptons imprimer les parties essentielles. En attendant l'édition du texte avec traduction et commentaire qui va paraître, nous l'espérons, dans quelques mois, nous désirons donner ici un compte rendu succinct de la vie des deux adversaires et de leur controverse qui servira en même temps à élucider le rôle joué par les études grecques chez les philosophes et médecins de l'Islam au V^e^ siècle de l'Hégire."

Ponzi, E. Per l'iconografia dell' operazione cesarea. *Rivista di storia delle scienze mediche* 28, 77-84, 2 pl., 1937. ISIS

Apropos of FIRDAWSI.

Rempis, Christian Herrnhold. AVICENNA als Vorläufer OMAR CHAJJĀMS. ENNO LITTMANN Festschrift, p. 149-56, Leiden, BRILL, 1935. ISIS

Ünver, A. Süheyl. Quelques données relatives aux dates de naissance et de mort du médecin philosophe turc IBN SINA (AVICENNE). *Tedavi klinigi ve laboratuvari dergisi* (Revue de thérapeutique clinique et expérimentale) 6, 65-7, Istanbul, 1936. ISIS

XIth Century (second half)

Macdonald, Duncan Black. Note on "The meanings of the philosophers by AL-GHAZZĀLĪ" (*Isis* no. 69, vol. XXV, 1, May 1936, pp. 9-15). *Isis* 27, 9-10, 1937. ISIS

Schmitt, Franciscus Salesius. Ein neues unvollendetes Werk des Hl. ANSELM VON CANTERBURY. *Beiträge zur Geschichte der Philosophie und Theologie des Mittelalters* 33, H. 3, 48 p., Münster i.W., 1936. ISIS

Including edition of *De potestate et impotentia, possibilitate et impossibilitate, necessitate et libertate.*

Whitehill, Walter Muir. The date of the earliest Latin-Arabic glossary (Leiden : Cod. 231 Scal.). 2 charts, 5 figures. *Isis* 26, 370-72, 1937. ISIS

Apropos of the Latin-Arabic glossary edited by C. F. SEYBOLD in 1900 (SARTON, *Introd.*, 1, 783). "The exact date of *Cod.* 231 *Scal.* cannot, of course, be determined without a careful study of the manuscript. I merely wish to point out here that paper was used in Spain earlier than SEYBOLD believed, and that the Visigothic minuscule, on the one folio which he reproduced has some of the characteristics of pre-eleventh century writing. There is, then, a good possibility that the earliest known Latin-Arabic Glossary is at least as old as the tenth century, and a certainty that the question deserves further investigation." G. S.

XIIth Century (whole and first half)

Arberry, A. J. An unknown work on zoology. *Journal of the Royal Asiatic Society* 481-83, 1937. ISIS

Apropos of a fragmentary Persian treatise on zoology of the first half of the sixth century of the Hegira in the India office library. "The book is divided into two main parts called maqālāt, so far at least as is preserved in this copy. The first maqāla treats of man, the human races, and the character and characteristics of man : in enumerating the various nations the author treats of the Persians first, and the Arabs last but two (he reserves the Abyssinians for the last place). The second maqāla deals with the animals, of which the first to be described, curiously enough, is the elephant. The author's interest in animals is not philological, as is the case with JĀḤIẒ and to some extent with DAMĪRĪ, but scientific. In some passages he records his own observations. Many names of animals occur which I have not seen in any other Islamic authority."

Austin, H. D. ARTEPHIUS-ORPHEUS. *Speculum* 12, 251-54, 1937. ISIS

Apropos of RISTORO D'AREZZO (XIII-2) and ARTEPHIUS (*Intr.* 2, 219). G. S.

Baeumker, Clemens. DOMINICUS GUNDISSALINUS als philosophischer Schriftsteller (1898). *Beiträge zur Geschichte der philosophie des Mittelalters*, Bd. 25, H. 1/2, 255-75, 1927. ISIS

Geyer, Bernhard. PETER ABAELARDS philosophische Schriften. II. Die logica " nostrorum petitioni sociorum " die Glossen zu PORPHYRIUS. *Beiträge zur Geschichte der Philosophie und Theologie des Mittelalters* Bd. 21, H. 4, 505-48, 1933. ISIS

Scalinci, Noè. Il Liber pro sanitate oculorum di Mº DAVIDE ARMENIO, oculista salernitano del secolo XII. Noto come " Tractatus de oculis CANAMOSALI." 110 p., ill. Naples, IDELSON, 1934. ISIS

I. Titolo des trattatello e suo autore; II. Quando e dove fu compilato il *Liber pro sanitate oculorum*; III. Contenuto e caratteristiche culturali del libro dell'ARMENIO; IV. Interessanti particolarità clinicoterapiche contenute nel *Liber pro sanitate oculorum*; V. Il trattatello dell'ARMENIO non ha nulla da vedere con l'opera dell'oculista arabo 'AMMĀR IBN 'ALĪ AL-MAUṢILĪ (CANAMOSALI); VI. La tavola d'istrumenti chirurgici esistente in alcuni MSS del *Liber pro sanitate oculorum*; VII. Il libro d'ARMENIO, como quello di BENVENUTO, venne anche copiato nel Ms del SINZANOGIO; VIII. Rapporti del libro dell'ARMENIO con quelli di Mº ZACCHARIA e di BENVENUTO; IX. Importanza del *Liber pro sanitate oculorum* per la coltura oftalmojatrica medioevale.

Weisweiler, Heinrich (S. J.). Das Schrifttum der Schule ANSELMS VON LAON und WILHELMS VON CHAMPEAUX in deutschen Bibliotheken. Ein Beitrag zur Geschichte der Verbreitung der ältesten scholastichen

Schule in deutschen Länden. *Beiträge zur Geschichte der Philosophie und Theologie des Mittelalters* Bd. 33, H. 1/2, XII+415 p. Münster i.W., 1936. ISIS

XIIth Century (second half)

Furlani, Giuseppe. The Yezidi villages in northern 'Irāq. *Journal of the Royal Asiatic Society* 483-91, 1937. ISIS

This is a valuable addition to the history of the Yazīdī, for which see my *Introd.* 2, 336. G. S.

(Maimonides). Regimen sanitatis des MAIMONIDES für den Sultan EL-MALIK AL-AFDHAL. Faksimile der Ausgabe Florenz (c. 1480) nach dem Exemplar der bayerischen Staats-Bibliothek, mit einem Vorwort von ARON FREIMANN. Heidelberg, GROSSBERGER, 1931. ISIS

Vaux, R. de. La première entrée d'AVERROËS chez les Latins. *Revue des sciences philosophiques et théologiques* 22, 193-243, 1933. ISIS

Vaux, R. de. Notes et textes sur l'Avicennisme latin aux confins des XII^e^-XIII^e^ siècles. 184 p. (*Bibliothèque Thomiste*, 20). Paris, VRIN, 1934. ISIS

Reviewed by RICHARD MCKEON, *Speculum* 12, 136-37, 1937.

XIIIth Century (whole and first half)

Baeumker, Clemens. Das pseudo-hermetische " Buch der vierundzwanzig Meister " (Liber XXIV philosophorum). Ein Beitrag zur Geschichte des Neupythagoreismus und Neuplatonismus im Mittelalter (1913). *Beiträge zur Geschichte der Philosophie des Mittelalters*, Bd. 25, H. 1/2, 194-207, 1927. ISIS

" So möge als die wahrscheinlichste Annahme die stehen bleiben, dass unsere Schrift ungefähr um 1200 oder nicht lange nachher, in der Zeit nicht allzuweit entfernt von den " Maximae theologiae " des ALANUS, entstand." " So bietet die Schrift in der Tat ein kompendiöses Manual des christianisierten Neuplatonismus, voll von bildhaft dunkeln, aber durch kühnen Ausdruck sich einprägenden Kernworten, die für verwandte Geister, wie ECKHART, BRADWARDIN und NIKOLAUS VON KUES, etwas Anziehendes haben möchten und das Stück überhaupt zu einem interessanten historischen Dokument machen, die uns freilich eben wegen ihres Spielens mit Bildern und gesuchten Gleichnissen philosophisch nicht viel mehr zu sagen haben."

Froehner, Reinhard. Die Pferdeheilkunde des AHMAD IBN HASAN IBN AL-AHNAF. Beitrag zur Geschichte der mittelalterlichen arabischen Tierheilkunde. Nach einer Handschrift aus dem Jahre 1209. *Hauptner-Instrumente, Neuheiten*, 1936, p. 39-56, Berlin, 1936. ISIS

Publication of thirteen very remarkable veterinary illustrations from a MS. of the university library of Cairo, dated 1209. It would be interesting to compare them with the illustrations available in Western MSS like those of BONIFACE OF GERACE (XIII-2; *Introduction*, vol. 2, 1093). The text is ascribed to one AḤMAD IBN ḤASAN IBN AL-AḤNAF whom I am unable to identify. The matter should be investigated by an Arabic scholar. The illustrations are beautifully reproduced and published in the form of a supplement to a trade catalogue of the Berlin firm H. HAUPTNER, veterinary instruments. FRÖHNER's study is followed by a bibliography including 20 titles. See also the note RIECK (1932) under " medicine " below relative to the history of veterinary instruments. G. S.

Hauberg, Poul. HENRIK HARPESTRAENG, *Liber herbarum*. 167 p. Copenhagen, Bogtrykkeriet Hafnia, 1936. ISIS

The Latin text of the *Liber herbarum* is here printed for the first time, together with a Danish translation, abundant notes and glossary. G. S.

Lacombe, George. ALFREDUS ANGLICUS in Metheora. *Beiträge zur Geschichte der Philosophie und Theologie des Mittelalters*, Supplement-band 3, 463-71, 1935. ISIS

Reynolds, Robert L. Two documents concerning elementary education in thirteenth-century Genoa. *Speculum* 12, 255-56, 1937. ISIS

Steiner, Arpad. The authorship of the *De disciplina scholarium*. *Speculum* 12, 81-4, 1937. ISIS

Vaux, R. de. Sur un texte retrouvé de DAVID DE DINANT. *Revue des sciences philosophiques et théologiques* 22, 243-45, 1933. ISIS

XIIIth Century (second half)

Baur, Ludwig. Die Form der wissenschaftlichen Kritik bei THOMAS VON AQUIN. *Beiträge zur Geschichte der Philosophie und Theologie des Mittelalters*, Supplement-band 3, 688-709, 1935. ISIS

Boüard, Michel de. Une nouvelle encyclopédie médiévale : la Compendium philosophiae. 208 p. Paris, DE BOCCARD, 1936. ISIS

Reviewed by LYNN THORNDIKE, *Speculum* 12, 114-15, 1937. "The volume before us for review consists of a rather uninspired and superficial analysis of the content and method of what is called a new mediaeval encyclopedia, but renders the useful service of editing at pages 121-206 portions of its text and the chapter headings of the remainder. The work is primarily an outline of the works of ARISTOTLE in philosophy based especially upon ALBERTUS MAGNUS. 'Compilatio de libris naturalibus ARISTOTELIS et aliorum quorundam philosophorum' is a better title for it than 'Compendium philosophiae.' It is a work somewhat comparable to the *Philosophia pauperum* which MANDONNET has recently reclaimed for ALBERTUS MAGNUS (*Revue néo-scolastique*, XXXVI, 1934, 230-262). Eleven manuscripts of the work are described at some length, but the published text is based solely upon that of 1320 A.D. of the Bibliothèque nationale, Paris."

Carmody, Francis J. BRUNETTO LATINI's *Tresor* : Latin sources on natural science. *Speculum* 12, 359-66, 1937. ISIS

Daujat, J. Note sur un fondateur de la physique du magnetisme au XIII[e] siècle : PIERRE DE MARICOURT. *Thalès* 2, 58-161, 1935 (Paris, 1936). ISIS

Diepgen, Paul. Die Weltanschauung ARNALDS VON VILLANOVA und seine Medizin. *Scientia* 38-47, 1937. ISIS

Feckes, Karl. Das Opusculum des hl. THOMAS VON AQUIN "De ente et essentia" im Lichte seiner Kommentare. *Beiträge zur Geschichte der Philosophie und Theologie des Mittelalters*, Supplementband 3, 667-81, 1935. ISIS

Geyer, Bernhard. Die ursprüngliche Form der Schrift ALBERTS DES GROSSEN *De animalibus* nach dem Kölner Autograph. *Beiträge zur Geschichte der Philosophie und Theologie des Mittelalters*, Supplementband 3, 578-90, 1935. ISIS

Gilson, Etienne. Saint THOMAS AQUINAS (Annual lecture on a master mind, Henriette Hertz Trust). *Proceedings of the British Academy*, vol. 21, 29-45, 1935. ISIS

Grabmann, Martin. Handschriftliche Forschungen und Funde zu den philosophischen Schriften des PETRUS HISPANUS, des späteren Papstes JOHANNES XXI (d. 1277). *Sitzungsberichte der Bayerischen Akademie der Wissenschaften*, philosophisch-historische Abteilung, Jahrgang 1936, H. 9, 137 p., München, 1936. ISIS

It is hardly necessary to insist anew upon the fundamental importance

of Prof. GRABMANN's investigations of mediaeval scientific MSS (see *Isis* passim, e.g., 13, 160, 205; 25, 530). The present volume devoted to PETER OF SPAIN deals with the *Summulae logicales* (p. 8-85) and with PETER's unpublished writings. "1. Der neu-aufgefundene *Tractatus maiorum fallaciarum*; 2. Der *Liber de anima*, das philosophische Hauptwerk des PETRUS HISPANUS; 3. Der Kommentar zu *De animalibus*; 4. Der Kommentar zu *De morte et vita et de causis longitudinis et brevitatis vitae*; 5. Der Kommentar zu *De anima*; 6. Ein dem PETRUS HISPANUS zugeschriebener Kommentar zu den Schriften des PSEUDO-AREOPAGITEN; Nachträge. 1. Die *Synkategoremata*, ein echtes und selbständiges Werk des PETRUS HISPANUS. Die ursprüngliche Gliederung seiner *Summae logicales*; 2. Der Kommentar des Dominikaners PHILIPPUS VON FERRARA zu den *Summulae logicales* des PETRUS HISPANUS." G. S.

Kühle, Heinrich. Zum Problem der *Summa theologiae* und der Sentenzenkommentare ALBERTS DES GROSSEN. *Beiträge zur Geschichte der Philosophie und Theologie des Mittelalters*, Supplementband 3, 591-610, 1935. ISIS

Lottin, Odon. Saint ALBERT LE GRAND et l'éthique à NICOMAQUE. *Beiträge zur Geschichte der Philosophie und Theologie des Mittelalters*, Supplementband 3, 611-26, 1935. ISIS

Mandonnet, Pierre. Note complémentaire sur BOÈCE DE DACIE. *Revue des sciences philosophiques et théologiques* 22, 246-50, 1933. ISIS

Mitterer, Albert. Der Wärmebegriff des hl. THOMAS nach seinem physikalischen Weltbild und dem der Gegenwart. *Beiträge zur Geschichte der Philosophie und Theologie des Mittelalters*, Supplementband 3, 720-34, 1935. ISIS

Ohm, Thomas. THOMAS VON AQUIN und die Heiden- und Mohammedanermission. *Beiträge zur Geschichte der Philosophie und Theologie des Mittelalters*, Supplementband 3, 735-48, 1935. ISIS

Partington, J. R. ALBERTUS MAGNUS on alchemy. *Ambix* 1, 3-20, 1937. ISIS

Rackl, Michael. THOMAS VON AQUIN im Werturteil eines byzantinischen Theologen. *Beiträge zur Geschichte der Philosophie und Theologie des Mittelalters*, Supplementband 3, 1361-1372, 1935. ISIS

Rucker, P. Palmaz. Der Ursprung unserer Begriffe nach RICHARD

VON MEDIAVILLA. Ein Beitrag zur Erkenntnislehre des Doctor SOLIDUS. *Beiträge zur Geschichte der Philosophie und Theologie des Mittelalters* 31, H. 1, XIV+174 p. Münster i.W., 1934. ISIS

Salman, D. ALBERT LE GRAND et l'Averroïsme latin. *Revue des sciences philosophiques et théologiques* 24, 38-64, 1935. ISIS

Schneider, Wilhelm. Die *Quaestiones disputatae de veritate* des THOMAS VON AQUIN in ihrer philosophiegeschichtlichen Beziehung zu AUGUSTINUS. *Beiträge zur Geschichte der Philosophie und Theologie des Mittelalters* 27, H. 3, 97 p., 1930. ISIS

Sudhoff, Karl. PEDRO HISPANO, ou, MELHOR, PEDRO LUSITANO, professor de medicina e filosofia e, finalmente, papa JOÃO XXI. III[e] congrès international d'histoire des sciences, Actes, conférences et communications, 365-73, Lisbon, 1936. ISIS

Thorndike, Lynn. Date of the translation by ERMENGAUD BLASIUS of the work on the quadrant by PROFATIUS JUDAEUS. *Isis* 26, 306-09, 1937. ISIS

Wilpert, Paul. Das Problem der Wahrheitssicherung bei THOMAS VON AQUIN. Ein Beitrag zur Geschichte des Evidenzproblems. *Beiträge zur Geschichte der Philosophie und Theologie des Mittelalters* 30, H. 3, XIV+214 p., 1931. ISIS

Wimsatt, W. K., jr. VINCENT OF BEAUVAIS and CHAUCER's *Cleopatra and Croesus*. *Speculum* 12, 375-81, 1937. ISIS

Zinner, Ernst. PETRUS DE DACIA, ein mittelalterlicher dänischer Astronom. *Archeion* 18, 318-29, 1936 (received 1937). ISIS

XIVth Century (whole and first half)

Hufnagel, Alfons. Studien zur Entwicklung des thomistischen Erkenntnisbegriffes im Anschluss an das Correctorium "Quare." *Beiträge zur Geschichte der Philosophie und Theologie des Mittelalters* 31, H. 4, 131 p., 1935. ISIS

Apropos of the Dominican defense of St. THOMAS, for which see my *Introd.* (2, 951). G. S.

Jones, Ida B. Popular medical knowledge in fourteenth century English

literature (part 1). The theory and practice of medicine (part 2). *Bulletin of the institute of the history of medicine* 5, 405-51, 538-88, 1937. ISIS

Kurdian, H. A correction to "Mirabilia descripta" (The wonders of the East), by Friar JORDANUS, circa 1330. *Journal of the Royal Asiatic Society* 480-81, 1937. ISIS

Lucas, Henry S. EDWARD III and the poet chronicler JOHN BOENDALE. *Speculum* 12, 367-69, 1937. ISIS

Post, Gaines. PETRARCH and HERACLITUS once more. *Speculum* 12, 343-50, 1937. ISIS

Previté-Orton, Charles William. MARSILIUS OF PADUA (Annual Italian lecture). *Proceedings of the British Academy*, vol. 21, 137-83, 1935. ISIS

Salomon, Richard. OPICINUS DE CANISTRIS. Weltbild und Bekenntnisse eines avignonesischen Klerikers des 14. Jahrhunderts. Mit Beiträgen von A. HEIMANN und R. KRAUTHEIMER. VIII+348 p., 14 pl. London, Warburg Institute, 1936. ISIS

Reviewed by GEORGE SARTON, *Isis* 26, 460-63, 1 pl., 1937.

Scalinci, Noè. Il magister JACOBUS DE BRUNDUSIO (GIACOMO PIPÌNO) Docente trecentesco di medicina nello studio di Napoli. *Rinascenza Salentina*, 4, 25 p., 1937. ISIS

Biography derived from archival documents (quoted in extenso) of a physician who obtained some reputation in the first quarter of the fourteenth century : GIACOMO PIPÌNO DI BRINDISI, who was already a royal physician attached to the Angevine court in 1296, and died in or after 1326. The author considers GIACOMO's activity under the following headings : royal physician, examiner in medicine and surgery, royal delegate to the conventus (to award the medical "laurea" in 1326), owner of a royal fief and knight, consultant. However as GIACOMO did not write any treatise his fame was ephemeral. The author compares him with his contemporary FRANCESCO DI PIEDIMONTE "A fianco quindi di FRANCESCO DA PIEDIMONTE, sinora ritenuto quasi il solo rappresentante del sapere medico di quel periodo di vero splendore degli Angioini, deve stare il Magister JACOBUS DE BRUNDUSIO, 'dilectus fisicus familiaris et fidelis' oltre che del Principe di Taranto, perfettamente alla pari del Pedemontano di due Re Angioini, e cioè come uno dei maggiori esponenti della coltura e dell' insegnamento medico ai tempi di CARLO II e di ROBERTO D'ANGIO." G. S.

XIVth Century (second half)

Hartley, Sir Percival Horton-Smith; Aldridge, Harold Richard. JOHANNES DE MIRFELD of St. Bartholomew's Smithfield. His life and works. XVI+191 p. Cambridge University Press, 1936. ISIS

Reviewed by MARY CATHERINE WELBORN, *Isis* 26, 458-60, 1937.

Khemiri, T. Der 'aṣabīya-Begriff in der Muqaddima des IBN KHALDŪN. *Der Islam* 23, 163-88, 1936. ISIS

Lot-Borodine, M. La grâce déifiante des Sacrements d'après NICOLAS CABASILAS. *Revue des sciences philosophiques et théologiques* 25, 299-330, 1936. ISIS

Redstone, Vincent B.; Redstone, Lilian J. The HEYRONS of London : a study in the social origins of GEOFFREY CHAUCER. *Speculum* 12, 182-95, 1937. ISIS

Thorndike, Lynn. Milan manuscripts of GIOVANNI DE' DONDI's astronomical clock and of JACOPO DE' DONDI's discussion of tides. *Archeion* 18, 308-17, 1936 (received 1937). ISIS

Thorndike, Lynn. Introduction and canon by DALMATIUS to tables of Barcelona for the years 1361-1433 A.D. *Isis* 26, 310-20, 1937. ISIS

Edition of the text upon a fifteenth century Ms. (Berne 227), with commentary. G. S.

Ünver, A. Süheyl. HÉKIM HADJI Pacha et l'hôpital de Kalavoun au Caire. *Türk tib tarihi arkivi* (Archives d'histoire de la médecine turque) 2, 12-15, 1937. ISIS

XVth Century (whole and first half)

Ayres de Sá. GONÇALO VELHO e CRISTÓVÃO COLOMBO. III^e^ congrès international d'histoire des sciences, Actes, conférences et communications 446-50, Lisbon, 1936. ISIS

Duhem, Jules. Les aerostats du moyen-âge d'après les miniatures de cinq manuscrits allemands. *Thalès* 2, 106-14, 1935 (Paris, 1936). ISIS

Schulz, H. C. THOMAS HOCCLEVE, scribe. *Speculum* 12, 71-81, 2 pl., 1937. ISIS

Tanfani, G. Una presunta ricetta di JACOPO DA FORLÌ nel codice a 28 della capitolare di Padova. *Rivista di storia delle scienze mediche e naturali* 28, 131-36, 2 facs., 1937. ISIS

Vansteenberghe, Edmond. Un " programme de vie " de la fin du moyen âge. Le *De exercitio proficientium* de PIERRE D'AILLY? *Beiträge zur Geschichte der Philosophie und Theologie des Mittelalters*, Supplementband 3, 1231-46, 1935. ISIS

Wolff, Georg. LEONE BATTISTA ALBERTI als Mathematiker. *Scientia*, 353-59, 1936.

XVth Century (second half)

Cortesão, Jaime. The pre-columbian discovery of America. *Geographical journal* 89, 29-42, 1937. ISIS

" I intend to deal only with the hypothesis of the pre-columbian discovery of America by the Portuguese. It is convenient to add that it has become a historic fact for the majority of Portuguese historians and many foreigners. Two errors have obscured this chapter in the history of geography : (1) the supposition that transoceanic voyages were more difficult than those along the coasts; (2) the neglect of the consideration that the economic objectives, pursued by the state, might prevent the divulgation of geographical discoveries from reasons of high policy." C. W. A.

Feis, Oswald. Die Krankheit WILHELM des Mittleren (ein Beitrag zur Frühgeschichte der Lues). *Janus* 41, 75-87, 1937. ISIS

Fontoura da Costa, A. L'Almanach perpetuum de ABRAHAM ZACUT, Leiria 1496. III^e^ congrès international d'histoire des sciences, Actes, conférences et communications 137-46, 4 fig., Lisbon, 1936. ISIS

Fränkel, Walter K. Dr. HIERONYMUS MÜNZER, ein Nürnberger Arzt der Frührenaissance 1440-1508. *Schweizerische Medizinische Wochenschrift* 64, 1015, 1934. ISIS

Fränkel, Walter K. Dr. HIERONYMUS MÜNZER, 1440-1508 Stadtarzt von Nürnberg, Humanist, Geograph und Schwiegervater Holzschuhers. *Medizinische Welt* 9, 12 p., 1935. ISIS

Siciliano, Italo. FRANÇOIS VILLON et les thèmes poétiques du moyen âge. XVI+582 p. Paris, COLIN, 1934. ISIS

" VILLON — l'homme autant que le poète — est donc ancré dans son temps. Il est ancré dans ce moyen âge qui commence avant le XII[e] et finit après le XV[e] siècle. Personne ne saura le tirer de l'époque de MARBODE et de CHARTIER, de l'époque qui donna les prières de saint BERNARD et de GUILLAUME ALEXIS, les méditations d'INNOCENT III et de PIERRE DE NESSON. Personne ne saura nous dire par quelle attitude de son âme ou par quel élément de son esprit (le don poétique mis toujours à part, car le génie n'est ni ancien ni moderne) il se détache du monde où il a vécu, de cette spiritualité médiévale qui l'a nourri. Personne ne comprendra VILLON si on ne le replace dans son temps. Cependant, depuis un siècle, depuis toujours, tout le monde répète avec une assurance inébranlable que VILLON est moderne. " Moderne " ? Qu'est-ce que cela signifie, au juste ?"

Suyūṭī, Jalāl ad-Dīn. Nuzhat al-'umr fī t-tafḍīl bain al-baiḍ wa 's-sūd wa s-sumr. 16 p. Damascus, Taraqqi Press, 1349. ISIS

Reviewed by ARTHUR JEFFERY, *Journal of the Royal Asiatic Society* 373, 1937.

Zimmermann, E. L. An early English manuscript on syphilis. A fragmentary translation from the second edition of GASPAR TORRELLA's *Tractatus cum consiliis contra pudendagram seu morbum gallicum. Bulletin of the institute of the history of medicine* 5, 461-82, 1 fig., 1937. ISIS

Leonardo da Vinci

Giacomelli, R. Gli scritti di LEONARDO DA VINCI sul volo. Pref. di C. FERRARI. 368 p., ill. Roma, BARDI, 1936. ISIS

L'auteur, dont les études sur LÉONARD DE VINCI et le vol mécanique ont déjà été signalées ici (*Isis* 4, 644; 15, 224, 225) a groupé les écrits et les dessins de LÉONARD en les réunissant par un commentaire en langage moderne, dans l'ordre chronologique pour autant qu'il puisse être suivi; le tout est réuni sous quatre chefs; Réactions et mouvements de l'air; Vol mécanique; Vol des oiseaux en air immobile; Vol des oiseaux en présence du vent; en appendice : Vol des libellules, des papillons, des chauves-souris. L. G.

Teck, Jean. L'automobile à ressort de LÉONARD DE VINCI. *Revue scientifique* 75, 152-53, 1937. ISIS

XVIth Century (whole and first half)

B. — *Physical sciences and technology*

Johannsen, Otto. PEDER MÅNSSONS Steinschneidekunst (um 1520). *Proteus* 2, 172-80, 4 fig., 1937. ISIS

Thorndike, Lynn. FAUST and JOHANN VIRDUNG of Hassfurt. *Isis* 26, 321, 1937. ISIS

Walde, O. Doktor JOHANN COPP. Ein Arzt und Astrologe aus der Reformationszeit. *Lychnos* 2, 79-111, 6 fig., Uppsala, 1937 (in Swedish with German summary). ISIS

C. — *Natural sciences*

Aešcoly, A. Z. DAVID REUBENI in the light of history. *Jewish quarterly review* 28, 1-45, 1937. ISIS

Cam, Gilbert A. GERARD MERCATOR, his *Imago mundi* of 1538. *Bulletin of the New York Public library*, vol. 41, 371-81, 1937. ISIS

Paoli, Umberto Giulio. Nuove notizie su MONÁRDES. *Archeion* 19, 44-50, 1937. ISIS

Tricot-Royer, Dr. Les " coloquios " de GARCIA D'ORTA aux officines PLANTIN à Anvers. III^e^ Congrès international d'histoire des sciences, Actes, conférences et communications, 373-84, Lisbon 1936. ISIS

D. — *Medical sciences*

Brito, Rocha. As epidemias do século XVI e as câmaras de Coimbra. III^e^ congrès international d'histoire des sciences, Actes, conférences et communications, 275-354, 1 pl., Lisbon, 1936. ISIS

Castiglioni, Arturo. GEROLAMO CARDANO e ANDREA VESALIO. *Rassegna clinico scientifica dell'Istituto biochimico italiano* 13, 16 p., 1935. ISIS

Esaguy, Augusto D'. GARÇIA DORTA and the Inquisition. *Bulletin of the institute of the history of medicine* 5, 483-87, 1937. ISIS

Friedenwald, Harry. AMATUS LUSITANUS. *Bulletin of the institute of the history of medicine* 5, 603-53, 7 fig., 1937. ISIS

Gasperini, Carlo Gasperino. BARTOLOMMEO DA PISA professore di medicina ed archiatra di LEONE X. *Rivista di storia delle scienze mediche e naturali* 28, 150-52, 1937. ISIS

Marsden, W. A. Early books on surgery. *British museum quarterly* 11, 85-7, 1937. ISIS

Apropos of early editions of AMBROISE PARÉ's works (Paris, 1564, 1575, 1585). G. S.

Mullett, Charles F. Some neglected aspects of plague medicine in sixteenth century England. *Scientific monthly* 44, 325-37, 1937. ISIS

Yaltkaya, M. Cherefeddin. Les opinions personnelles d'un médecin turc du XVI[e] siècle concernant le café. *Türk tib tarihi arkivi* (Archives d'histoire de la médecine turque) 2, 7-9, 1 pl., 1937. ISIS

E. — *Alia*

Allen, Walter, jr. BEATUS RHENANUS, editor of TACITUS and LIVY. *Speculum* 12, 382-85, 1937. ISIS

Almquist, Jan Eric. Zwei bisher ungedruckte juridische Schriften von OLAVUS PETRI. Herausgegeben und kommentiert. *Lychnos* 2, 130-147, Uppsala 1937 (in Swedish with German summary). ISIS

(Erasmus). The education of a Christian Prince. Translated with an introduction on ERASMUS and on ancient and mediaeval political thought by LESTER K. BORN. IX+277 p. (Records of civilization). New York, Columbia University Press, 1936. ISIS

Reviewed by WALLACE K. FERGUSON, *American historical review* 42, 742, 1937.

(Erasmus). Gedenkschrift zum 400. Todestage des ERASMUS von Rotterdam. Hrsg. von der Historischen u. Antiquarischen Gesellschaft zu Basel. 326 p., Basel, Verl. BRAUS-RIGGENBACH, 1936. ISIS

Reviewed by OTTO KLUGE, *DLZ* 58, 877-81, 1937 and by J. N., *Lychnos* 2, 404, Uppsala, 1937 (in Swedish).

Gautier-Vignal, L. ERASME 1466-1536. 282 p., 4 pl. Paris, PAYOT, 1936. ISIS

Hanke, Lewis. Pope PAUL III and the American Indians. *Harvard theological review* 30, 65-102, 1937. ISIS

Heidingsfelder, Georg. Zum Unsterblichkeitsstreit in der Renaissance (PETRUS POMPONATIUS, d. 1525). *Beiträge zur Geschichte der Philosophie und Theologie des Mittelalters*, Supplementband 3, 1265-1286, 1935. ISIS

Larkey, Sanford V. Scientific glossaries in sixteenth century English books. *Bulletin of the institute of the history of medicine* 5, 105-14, 1937. ISIS

Polet, Amédée. Une gloire de l'humanisme belge PETRUS NANNIUS (1500-1557). XVI+350 p. (Recueil de travaux publiés par les membres des conférences d'histoire et de philologie de l'Université de Louvain, fasc. 39, 2e série). Louvain, Librairie universitaire, 1936. ISIS

Préchac, François. ERASME et l'humanisme. *Revue d'histoire de la philosophie* 16, 281-325, 1936. ISIS

Van Damme, Daniel. Ephéméride illustrée de la vie d'ERASME. Edition du IVe centenaire de la mort d'ERASME, 1536-1936. Anderlecht-Bruxelles, La Société anonyme de photogravure d'art, 1936. ISIS

Reviewed by A. POGO, *Isis* 26, 463-64, 1937.

XVIth Century (second half)

A. — *Mathematics*

Pelseneer, Jean. Remarques sur une lettre inédite de SIMON STEVIN. *Lychnos* 2, 373-77, 2 facs., Uppsala, 1937. ISIS

Lettre datée de 1618 conservée aux archives de Stockholm. G. S.

Thureau, M. JACQUES PELETIER, mathématicien manceau du XVIe siècle. 27 p. LAVAL, 1935. ISIS

PELETIER avait fait l'objet d'une thèse soutenue en 1907 devant la Faculté des lettres de Caen par l'abbé JUGÉ et consacrée principalement au poète; au point de vue scientifique, il y a des études de MARQUET : " PELETIER et l'algèbre du XVIe siècle (1873), et du Dr. DELAUNAY : " Vieux médecins sarthois." La présente notice étudie PELETIER mathématicien. PELETIER (1517-1582) entre à treize ans au College de Navarre à Paris, écoute peut-être les leçons d'ORONCE FINÉ au Collège de France, se lie avec PIERRE FORCADEL, s'installe à Lyon en 1553, y rencontre CARDAN, puis effectue d'assez longs voyages et s'arrête notamment chez MONTAIGNE. On lui doit une

Arithmétique, inspirée de GEMMA FRISIUS et qui connut de nombreuses éditions, une *Algèbre* (1554) en français, rééditée en latin, une *Géométrie* (1557), qui suscita les critiques de CLAVIUS mais que WALLIS devait encore défendre un siècle plus tard, un *Commentaire de la constitution de l'horoscope* (1563), et enfin un opuscule *De contactu linearum*, dont on ne connaît plus qu'un seul exemplaire. Analyse sommaire de ces œuvres. Une lettre de PELETIER à CARDAN (pp. 20-21) mérite qu'on fasse figurer son auteur dans l'histoire des géométries non-euclidiennes. PELETIER aurait admis le système de COPERNIC dès sa publication (p. 23). J. P.

B. — *Physical sciences and technology*

Humberd, Charles D. TYCHO BRAHE's island. *Popular astronomy* 45, 118-25, map, fig., 1937. ISIS

The illustrations reproduce the Cologne map of 1586, "Topographia Insulae Huenae," and an insert of the map showing the elevation and plan of Uraniborg. The description is a translation of the explanations printed, in Latin, on the back of the map. A. P.

McColley, Grant. An early friend of the Copernican theory : GEMMA FRISIUS. *Isis* 26, 322-25, 1 fig., 1937. ISIS

"As the various historians of the Copernican hypothesis have pointed out, discussions favorable to the new conception of the universe are limited in number throughout the larger part of the Sixteenth Century. Exclusive of REINHOLD and his *Tabulae Prutenicae*, the unusually full account of DREYER mentions but three statements of this nature during the decade from 1550 to 1560. Two of these occur in the prefatory epistles of JOHN FIELD and JOHN DEE in FIELD's *Ephemeris* for 1557, published in 1556. The third account, also of this year, appears in the *Castle of Knowledge* of ROBERT RECORDE. To these three important references to the new theory, a fourth should be added, the *Epistola* which GEMMA FRISIUS wrote in 1555 for the *Ephemerides Novae* of IOANNES STADIUS."

McColley, Grant. A facsimile of SALUSBURY's translation of DIDACUS A STUNICA's *Commentary upon Job*. *Annals of science* 2, 179-82, 1937. ISIS

McColley, Grant. FRANCESCO GIUNTINI and the Copernican hypothesis. *Popular astronomy* 45, 3 p., facs., 1937. ISIS

"Among various indices which reveal the growing prestige of the heliocentric hypothesis after 1543, few are more suggestive than its gradual appearance in expositions written in the native tongue. Outstanding among such accounts is *A perfit description of the caelestial orbes* which, with a diagram, THOMAS DIGGES appended in 1576 to a revision of his father's *Prognostication euerlastinge*. Much less important than the digest of DIGGES, but withal worthy of mention, is the apparently unnoticed account, and diagram, which FRANCESCO GIUNTINI inserted in his Italian *La Sfera del Mundo*, Lyon, 1582."

Sandblad, Henrik. Une notice biographique sur TYCHO BRAHE. *Lychnos* 2, 366-68, Uppsala 1937 (in Swedish with French summary). ISIS

" En vue de servir à la biographie de TYCHO-BRAHE, on communique ici un document inconnu jusqu'à présent et qui donne quelques éclaircissements sur l'épisode bien connu où, au cours de ses études à Rostock, il eut le nez tranché. Cette notice se trouve retracée par JACOB STOLTERFOHT, prêtre de Lübeck, dans son ouvrage *Consideratio Visionum apologetica* (1645) et le texte original en est reproduit ici, note 9."

C. — *Natural sciences*

Lynam, Edward. An atlas of England and Wales. The maps of CHRISTOPHER SAXTON, engraved 1574-1579. Introduction. VI p. London, British Museum, 1936. ISIS

Reviewed by E. HEAWOOD, *Geographical journal* 88, 556-58, 1936. Separate introduction to the atlas which is now available complete in parts issued during the last few years. C. W. A.

Lynam, Edward. BOAZIO's map of Ireland, circa 1600. *British museum quarterly* 11, 92-5, 2 pl., 1937. ISIS

(Saxton, Christopher). An atlas of England and Wales. The maps of CHRISTOPHER SAXTON, engraved 1574-1579. Introduction by EDWARD LYNAM. London, British Museum, 1936. ISIS

D. — *Medical sciences*

Bayon, H. P. The authorship of CARLO RUINI's " Anatomia del Cavallo." *Journal of comparative pathology and therapeutics* 48, 138-48, 9 fig., 1935. ISIS

" Several reasons justify the desire of ascertaining the authorship of the drawings and text of the book on the anatomy of the horse first printed in Bologna in 1598 under the name of CARLO RUINI. This work was not only the first, but remained for a long time the best and most complete, treatise on equine anatomy and medicine; accordingly it was extensively copied and indeed became the basis of all subsequent advances in knowledge of the subject. Then the text contains views on the pulmonal and general circulation of the blood, which at the time were certainly revolutionary, even if in the main correct. Moreover the artistic excellence of some of these anatomical tables was not approached, even when reproduced; not till the appearance of the remarkable engravings of GEORGE STUBBS (1724-1806) published in 1766; whose splendid illustrations of the muscles of the horse, representing dissections made by the artist, were not completed by representations of the inner organs." " Whilst the text of the book may

have been compiled and written by RUINI, the drawings must have been founded on the work of a skilful anatomist working with a supreme craftsman. From the evidence of the sketches that remain and the style of the plates it can be suggested that LEONARDO DA VINCI's drawings served as a basis for a great part of those reproduced."

Brunn, W. v. Eine Handschrift vom "Augendienst" des GEORG BARTISCH von Königsbrück (1535-1607). *Klinische Wochenschrift* 15, 1363-66, 5 fig., 1935; 16, 1363, 1936. ISIS

Fényes, Giuseppe. Nuovi contributi sulla morte di FRANCESCO e GIOVANNA DE' MEDICI. *Rivista di storia delle scienze mediche* 28, 1-23, 19 fig., 1937. ISIS

E. — *Alia*

Bernard, Henri (S.J.). Le Père MATTHIEU RICCI et la Société chinoise de son temps (1552-1610). 2 vol., 250 p. (Publications de l'Institut des hautes études de Tientsin). Tientsin, 1937. ISIS

Flower, Robin. LAURENCE NOWELL and the discovery of England in Tudor times (Sir ISRAEL GOLLANCZ memorial lecture). *Proceedings of the British Academy* vol. 21, 47-73, 1 facs., 1935. ISIS

Lindberg, Sten. Die Büchersammlung König JOHANNS III. *Lychnos* 2, 212-20, Uppsala ,1937 (in Swedish with German summary). ISIS

"In der Kgl. Bibliothek zu Stockholm gibt es ein bisher ungedrucktes Bücherverzeichnis des Königs JOHANN III., das in mannigfaltiger Weise die Interessen und die Persönlichkeit dieses interessanten Renaissancefürsten beleuchten. Vor allem fällt die grosse Zahl von theologischen Büchern in die Augen, aber auch die historischen Klassiker sind gut repräsentiert. Das hier abgedruckte Verzeichnis nimmt jedoch nicht alle Nummern der damaligen königlichen Bibliothek (von 1571) auf, sondern ist als ein Teilverzeichnis zu betrachten."

Stegmüller, Friedrich. Geschichte des Molinismus. Erster Band, Neue Molinaschriften. *Beiträge zur Geschichte der Philosophie und Theologie des Mittelalters*, Bd. 32, XII+788 p. Münster i.W., 1935. ISIS

XVIIth Century (whole and first half)

A. — *Mathematics*

Descartes. Correspondance, publiée avec une introduction et des notes,

par CH. ADAM et G. MILHAUD. Tome I, X+477 p. Paris, ALCAN, 1936. ISIS

Reviewed by J. PELSENEER, *Isis* 26, 464-65, 1937.

Descartes. La Revue de métaphysique et de morale a consacré son fascicule de janvier 1937 (352+28 p.) à DESCARTES, à l'occasion du troisième centenaire du *Discours de la méthode*. ISIS

Ce N° contient les articles suivants : LÉON BRUNSCHVICG : La pensée intuitive chez DESCARTES et chez les cartésiens. EMILE BRÉHIER : Matière cartésienne et création. ALBERT RIVAUD : Quelques réflexions sur la méthode cartésienne. S. V. KEELING : Le réalisme de DESCARTES et le rôle des natures simples. JEAN LAPORTE : La liberté selon DESCARTES. HENRI GOUHIER : DESCARTES et la vie morale. GINO LORIA : DESCARTES géomètre. FEDERIGO HENRIQUES : DESCARTES et GALILÉE. H. DREYFUS LE FOYER : Les conceptions médicales de DESCARTES. E. SIGNORET : Cartésianisme et aristotélisme. C. VON BROCKDORFF : DESCARTES et les lumières françaises. GEORGES BEAULAVON : La philosophie de J. J. ROUSSEAU et l'esprit cartésien.

Roland, P. PASCAL et le calcul infinitésimal. *Revue scientifique* 75, 148, 1937. ISIS

Shapiro, I. A. DONNE a Tychonian? *Times literary supplement*, p. 528, London, July 17, 1937. ISIS

B. — *Physical sciences and technology*

Capart, Jean. NARDI or KIRCHER (*Isis* 24, 430-1, 1 fig., 1936). Answer to query no. 56. *Isis* 26, 449, 1937. ISIS

Gabrieli, Giuseppe. I Lincei e la Cina. A proposito di oriente ed occidente nella storia della scienza. 15 p. (Reale accademia nazionale dei Lincei, Estratto dal Rendiconti della classe di scienze morali, storiche e filologiche 12). Rome, BARDI, 1936. ISIS

Apropos of HENRI BERNARD : GALILÉE et les Jésuites des missions d'Orient (1935; *Isis* 25, 539), FEDERICO CESI, Duca d'Acquasparta (1585-1630) and other founders of the Accademia dei Lincei. G. S.

Lüdtke, Heinrich. JOACHIMI JUNGII LUBECENSIS, Dr. phil. et Dr. med. (weiland Professor in Giessen, Rostock, Helmstedt und von 1629 bis 1657 Rektor des Akademischen Gymnasiums zu Hamburg). Handschriftlicher Nachlass in der Bibliothek der Freien und Hansestadt Hamburg. Ein Katalogisierungs-Versuch. *Archiv für Geschichte der Medizin* 29, 366-405, 1937. ISIS

Lüdtke, Heinrich. Materialien über die Beziehungen zwischen JUNGIUS und DESCARTES. *Archiv für Geschichte der Medizin* 29, 409-22, 1937. ISIS

Lüdtke, Heinrich; Meyer, Adolf. Zur Aktualität des JOACHIM JUNGIUS. *Archiv für Geschichte der Medizin* 29, 406-08, 2 fig., 1937. ISIS

Metzger, Hélène. La philosophie chimique de JEAN-BAPTISTE VAN HELMONT. *Annales Guébhard-Séverine* 12, 140-55, 1936. ISIS

Meyer, Adolf. Neue Beiträge zur JUNGIUS-Forschung. *Archiv für Geschichte der Medizin* 29, 363-65, 1937. ISIS

Nicolson, Marjorie. The microscope and English imagination. *Smith College studies in modern languages* 16, 92 p., 1935. ISIS

"In the pages which follow, I shall attempt to reconstruct an almost unnoticed chapter in the history of English thought and English literature, as the microscope grew in popularity, and as scientists and laymen found themselves amazed at its discoveries. The interest in the instrument appears first of all, after one or two semi-scientific works, in the minutes of the Royal Society, in which may be seen the development from mere human curiosity over the magnification of common objects to an awareness—as the microscope was developed in power—of its importance for scientific discovery, and a growing realization of its implication for philosophy. From the Royal Society, the microscope passed to the amateur and the layman, stimulating both satiric and serious themes in literature, even influencing the remarkable technique of at least one work of major importance."

Pogo, Alexander. IOANNES NARDIUS (ca. 1580-ca. 1655). *Isis* 26, 326-29, 1937. ISIS

1. Date of NARDI's birth; 2. Date of NARDI's death; 3. Medical studies in Pisa; 4. The plague in Florence, 1630; 5. NARDI's edition of LUCRETIUS; 6. Noctes geniales; 7. Pseudo-Nardiana; 8. NARDI's principal writings; 9. Additional Nardiana.

Shapiro, I. A. JOHN DONNE the astronomer, the date of the eighth problem. *Times literary supplement*, July 3, p. 492, London, 1937. ISIS

C. — *Natural sciences*

Bure, Anders. Orbis arctoi nova et accurata delineatio, auctore ANDREA BUREO Sueco 1626. Edited by HERMAN RICHTER, in collaboration

with WILHELM NORLIND. XXII+49 p., 8 maps (Publications from the Geographical institute of the University of Lund, Treatises. III). Lund, GLEERUPS Förlag, 1936. ISIS

Reviewed by E. LYNAM, *Geographical journal* 89, 83-5, 1937. "Swedish surveys towards the end of the sixteenth century were facilitated by astronomical determination of the latitude and longitude of many places in the north, under the influence of TYCHO BRAHE. His methods were followed by ANDERS BURE and his brothers JOHAN and OLOF. The topographical notes show how closely BURE and his assistants had surveyed the wild and sparsely populated districts of northern Sweden and Finland before they drew a map worthy of being dedicated to GUSTAVUS ADOLPHUS." C. W. A.

Gabrieli, Giuseppe. Un contributo dei missionari cattolici alla prima conoscenza naturalistica del Messico. Nel "Tesoro messicano" edito dalla prima Accademia dei Lincei Roma (1651). *Il Pensiero missionario* 5, 14 p., 1933. ISIS

"La prima e la più ricca opera pubblicata in Europa sulla storia naturale del Messico vide la luce in Roma nel 1651, ma era già quasi tutta stampata e pronta fin dal 1628. Presto nota fra i dotti col nome di 'libro delle piante Indiane' o 'Tesoro Messicano,' essa portava propriamente il titolo di *Rerum medicarum Novae Hispaniae Thesaurus*, e fu l'ultima pubblicazione della vecchia gloriosa romana *Accademia dei Lincei*. Il cui istitutore e principe FEDERICO CESI, avendo messo la mano su un sommario che il medico napoletano N. A. RECCHI aveva fatto in Madrid della voluminosa opera, largamente illustrata con molte tavole a colori, redatta dallo spagnuolo FRANCESCO HERNANDEZ in una apposita sua dimora nel Messico, per ordine di FILIPPO II, sulla flora e la fauna di quella regione, volle e fece il CESI che a sue spese l'Accademia ne preparasse ed eseguisse la stampa, corredandola di dottissimi commenti a cura di vari Lincei, specialmente dei due tedeschi SCHRECK e FABER e del botanico napoletano FABIO COLONNA."

D. — *Medical sciences*

Izquierdo, Jose Joaquin. HARVEY: Iniciador del metodo experimental. XVII+398 p. Ediciones ciencia, Mexico, 1936. ISIS

This beautifully printed first Spanish translation of HARVEY's *De motu cordis* is admirably embellished by a scholarly and comprehensive discussion of the work of HARVEY's predecessors in physiology, an excellent analysis of the factors in HARVEY's life contributing to his success, a facsimile of the first edition, and valuable annotations to the translation. There is a good appraisal of the relation of HARVEY's work to the ideas proposed by FRANCIS BACON. The analysis of the notions on the heart and circulation of ARISTOTLE, GALEN, and their followers is fully illustrated by quotation. This splendid volume comes appropriately from the distinguished professor of physiology of the Faculty of medicine of the University of Mexico. The volume is well indexed and has good bibliographical sections. C. D. L.

Mullett, Charles F. The plague of 1603 in England. *Annals of medical history* 9, 230-47, 1937. ISIS

Napjus, J. W. Een portret van WINSEMIUS. *Bijdragen tot de geschiedenis der geneeskunde* 17, 85, 1 pl., 1937. ISIS

Scultetus, Johannes. Three answers to query 61 by A. C. KLEBS, KATE C. H. MEAD, and C. DORIS HELLMAN. *Isis* 27, 63-6, 1937. ISIS

Temkin, Owsei. GUILLAUME ADER and his contribution to Biblical medicine. *Bulletin of the institute of the history of medicine* 5, 247-58, 1 fig., 1937. ISIS

" The interpretation of the diseases and miraculous cures related in the Bible has always formed an essential part of theological studies and, due to the theological rather than medical interests of the middle-ages, it was the theologians rather than the physicians who treated the subject during that period. It is only from the 16th century on that we find an increasing number of medical authors and the ' Enarrationes de aegrotis et morbis in Evangelio ' published by GUILLAUME ADER in 1620 is, therefore, one of the early forerunners of such famous works as THOMAS BARTHOLINUS' ' De morbis biblicis ' and RICHARD MEAD's ' Medica sacra.'

Vannier, L. L'œuvre de O. CROLLIUS (1580-1609). *Bull. de la soc. franç. d'hist. de la méd.* 31, 91-108, 1937. ISIS

E. — *Alia*

Gabrieli, Giuseppe. GIOVANNI SCHRECK Linceo gesuita e missionario in Cina e le sue lettere dall'Asia. 53 p. (Reale accademia nazionale dei Lincei, estratto dal *Rendiconti della classe di scienze morali, storiche e filologiche*, 12). Rome, BARDI, 1937. ISIS

Elaborate biography and bibliography of GIOVANNI SCHRECK (JOHANNES TERRENTIUS, alias SCHRECK SUEVUS born in the diocese of Constance 1576, died in Peking 1630). G. S.

Källquist, Eskil. Zur Geschichte des Lateinunterrichts in Schweden. Einige Bemerkungen über JACOB RUDBECKIUS. *Lychnos* 2, 221-26, Uppsala, 1937 (in Swedish with German summary). ISIS

Apropos of the teaching of Latin in Stockholm c. 1631. G. S.

McColley, Grant. The pseudonyms of FRANCIS GODWIN. *Philological quarterly* 16, 78-80, 1937. ISIS

Apropos of the author of the " Man in the Moone " that is bishop FRANCIS GODWIN (1562-1633) " Of particular importance to the history of scientific ideas is the apparent fact that the author, as E. M., wrote the epistle ' To the ingenious reader.' The content of *The man in the moone* shows quite definitely that the work was directly influenced by the new astronomy and the new physics, but it is this epistle which specifically informs us that the dominant motivation came from the celestial discoveries which followed COPERNICUS, KEPLER, and the telescope of GALILEO. If, as the evidence has indicated, we should consider E. M. as FRANCIS GODWIN, this serious historian and Bishop of the Anglican Church consciously stated a decade and a half after the telescope that the new astronomy had then become a fundamental theme in literature." G. S.

McColley, Grant. The third edition of FRANCIS GODWIN's *The man in the moone*. *Transactions of the bibliographical society, the library*, p. 472-75, 1937. ISIS

" That *The man in the moone* of Bishop GODWIN was eight times reprinted in 130 years, four times as an independent publication, with an equal number of issues appearing in the popular chap-book of NATHANIEL CROUCH, shows quite definitely that the work had in England a greater vogue than we have tended to ascribe to it on the basis of the four (or three) editions generally catalogued. In the light of its success and probable influence in England, and its success and known influence on the Continent, it is, it would seem, somewhat of a question as to the reason why it has no place, both in text and bibliography, in such a work as *The Cambridge history of English literature*."

Monteiro, Arlindo Camilo. De l'influence portugaise au Japon. Quelques passages du Prof. GUILLAUME DUVAL de la faculté de médecine de Paris (1612-1646). III^e^ congrès international d'histoire des sciences, Actes, conférences et communications, 199-227, 4 pl. Lisbon, 1936. ISIS

Nordström, Johan. Le romantisme de l'histoire et la politique sous le règne de GUSTAVE ADOLPHE. Le discours prononcé en 1625 par PEDER ERIKSSON. Publié par JOHAN NORDSTRÖM. *Lychnos* 2, 378-92, Uppsala, 1937 (in Swedish with French summary). ISIS

XVIIth Century (second half)

A. — *Mathematics*

Hiscock, W. G. DAVID GREGORY, ISAAC NEWTON and their circle. Extracts from DAVID GREGORY's *Memoranda*, 1677-1708. IX+48 p., frontispiece. Oxford, printed for the Editor, 1937 (10 s.). ISIS

Langer, Rudolph E. ISAAC NEWTON. *Scripta mathematica* 4, 241-55, 1937. ISIS

Lippmann, Edmund O. von. NEWTON und die Alchemie. *Die Naturwissenschaften* 25, 238, 1937. ISIS

Richeson, A. W. Notes on a 17th-century English mathematical manuscript. *National mathematics magazine* 11, 165-71, 1937. ISIS

Schofield, B. A Newton alchemical manuscript. *British museum quarterly* 11, 66, 1937. ISIS

Schrecker, Paul. ARNAULD, MALEBRANCHE, PRESTET et la théorie des nombres négatifs (d'après une correspondance retrouvée). *Thalès* 2, 82-90, 1935 (Paris, 1936). ISIS

Schrecker, Paul. L'unité de la pensée scientifique de LEIBNIZ. *Thalès* 2, 130-35, 1935 (Paris, 1936). ISIS

B. — *Physical sciences and technology*

Clark, G. N. Social and economic aspects of science in the age of NEWTON. *Economic history* 3, 362-79, 1937. ISIS

A criticism of B. HESSEN's theory (1931). " In the sixteenth and seventeenth centuries Western civilization was being transformed by two great movements : the economic changes which we sum up as the rise of capitalism, and the changes in knowledge which we sum up as the scientific movement. Each began long before that time, and each has lasted long after it, but in that period both were triumphantly proceeding, and it was then that our civilization entered on its present phase, in which the power of science in action has carried it over all the world. Economic historians have asked and answered many questions about the relations of the two movements. They have traced the influence of science on technology and on economic life, the influence of economic needs on education, the influence of new wealth and world-wide trading on knowledge and beliefs. Whichever of these lines of inquiry they follow, sooner or later they come upon the question, what light does economic history thrown on the history of the scientific movement itself? Some of them hold that the origin and nature of that movement are best understood if they are explained in terms of economic history. I wish to examine this theory, especially in its application to the glorious advances of science in the late seventeenth century."

Dahl, Folke. King CHARLES GUSTAVUS of Sweden and the English astrologers WILLIAM LILLY and JOHN GADBURY. *Lychnos* 2, 161-86, Uppsala, 1937. ISIS

Liesegang, F. Paul. Der Missionar und Chinageograph MARTIN

MARTINI (1614-1661) als erster Lichtbildrechner. *Proteus* 2, 112-16, 1937. ISIS

McColley, Grant. The astronomy of *Paradise Lost*. *Studies in philology* 34, 209-47, 1937. ISIS

Metzger, Hélène. Le deuxième centenaire de la mort de GEORG ERNEST STAHL (1660-1734). III[e] congrès international d'histoire des sciences, Actes, conférences et communications, 190-94, Lisbon, 1936. ISIS

Roberts, Michael ; Thomas, E. R. NEWTON and the origin of colours. A study of one of the earliest examples of scientific method VIII+133 p. London, BELL, 1934. ISIS

C. — *Natural sciences*

Åkerström, Åke. Die Reise URBAN HIÄRNES nach Deutschland und Holland im Jahre 1667. *Lychnos* 2, 187-211, Uppsala, 1937 (in Swedish with German summary). ISIS

Bontekoe, Cornelis. (1647-85). Tractatus de herba thee, 1678. *Opuscula selecta Neerlandicorum de arte medica*, fasc. XIV, p. li-ciii, 116-465, 1937. ISIS

This reprint of BONTEKOE's treatise on tea (one of the earliest treatises on the subject) fills more than half of vol. XIV of the *Opuscula*. F. M. G. DE FEYFER has provided a long introduction, then follows the text (in Dutch and English) of BONTEKOE's preliminary chapters " A warning to all who will read this book and judge of it." " To the lovers of tea." " A short discourse on life, disease and death, also on doctors and the medicine of our time, especially in our country," then the treatise itself " On the drinking of water." Though tea was known in Holland before that time it was the publication of BONTEKOE's treatise which popularized it. BONTEKOE's praise of tea as a panacea made a great impression, so much so that a reaction set in. " BONTEKOE soon fell a victim to his reputation as a tea-doctor, for his opponents, and he had many of them, considered his praises suspicious, ascribed his enthusiasm to personal interest and suspected him of being a tea-propagandist of the East India Company who was well paid. With this reputation he entered the world of history and still the blemish rests on him of having made his art subservient to the medicine trade. The so-called tea-contest forms one of the most interesting periods of national medical science, since the principal qualities of character of the physicians were reflected in it. Great commercial interests were at stake with the spreading of the use of tea. Before the importation of tea, wine and beer were the daily drinks of the general public. Not unjustly both the beer-brewers and the wine-merchants regarded the increasing use of tea as a danger to their trade and it sooner to be expected that a paid opposition

was organized by the adversaries. Nevertheless, SPRENGEL writes that during BONTEKOE's life the time had come when the eagerness for gain of the Dutch merchants and the theories of the fashionable physicians mutually lent each other a helping hand to recommend tea as a panacea and as the best means for the preservation of health. As the Dutch since a short time imported tea from China, nothing could be more welcome to them than a theory which considered dilution of the blood by means of this beverage necessary to health." (p. liii). G. S.

Cole, F. J. JAN SWAMMERDAM. *Nature* 139, 287, 1937. ISIS

Appendix to the article published in *Nature*, Feb. 6, p. 218.

Cole, F. J. LEEUWENHOEK's zoological researches—part II. Bibliography and analytical index. *Annals of science* 2, 185-235, 1937. ISIS

Cole, F. J. SWAMMERDAM's home. *Annals of science* 2, 236, 1 pl., 1937. ISIS

Friedman, Reuben. GIOVAN COSIMO BONOMO (1663-96) the 250th anniversary of his discovery of the parasitic nature of scabies. *Medical life* 44, 3-62, facsimiles, 1937. ISIS

This account is followed by complete facsimiles of BONOMO's ms. letter of FRANCESCO REDI, and REDI's publication of the same *Osservazioni intorno a' pellicelli del corpo umano* (Firenze, 1687). A very fine gift to the readers of *Medical life!* G. S.

Hult, O. T. Sur A. VAN LEEUWENHOEK et les pionniers de la microscopie, ainsi que quelques notes sur l'histoire des débuts du microscope en Suède. *Lychnos* 2, 313-40, 14 fig., Uppsala, 1937 (in Swedish with French summary). ISIS

Rijnberk, Matilde van. De briefwisseling tusschen LEEUWENHOECK en MAGLIABECHI. *Bijdragen tot de geschiedenis der geneeskunde* 17, 126-38, 1937. ISIS

Schierbeek, A. JAN SWAMMERDAM (12. Febr. 1637-17 Febr. 1680). *Bijdragen tot de geschiedenis der geneeskunde* 17, 41-66, 1937. ISIS

Sundquist, Nils. OLOF RUDBECKS botaniska prefekthus. *Svenska Linné-Sällskapets Årsskrift* 20, 145-71, 30 fig., 1937 (in Swedish). ISIS

Tyson, Edward (1650-1708). *Q*uery no. 67 by M. F. ASHLEY-MONTAGU. *Isis* 26, 451, 1937. ISIS

D. — *Medical sciences*

Bonomo, Giovan Cosimo. La polemica BONOMO-LANCISI sull' "Origine acarica della scabbia." XIX+44 p. Livorno, Belforte, 1937. ISIS

Friedman, Reuben. A translation of BONOMO's manuscript letter to REDI. *Medical life* 44, 156-64, facs., port., fig., 1937. ISIS

"Under the date of June 20, 1687, GIOVAN COSIMO BONOMO, a young physician of Leghorn, Italy, sent his now famous letter—detailing the discovery of the parasitic nature of scabies—to his friend and mentor, FRANCESCO REDI. The latter re-wrote it; dated the re-written version July 18, 1687, and published the letter, in pamphlet form, in Florence, Italy, as of that date."

Napjus, J. W. Onderzoek in Engeland en Frankrijk naar een opvolger van JOHANNES ANTONIDES VAN DER LINDEN als medisch Hoogleeraar te Leiden. *Bijdragen tot de geschiedenis der geneeskunde* 17, 99-102, 1937. ISIS

Piso, Willem (1611-78). Selected chapters from his *Historiae naturalis et medicae Indiae occidentalis libri quinque*. Amsterdam 1658 (in Latin and English). *Opuscula selecta Neerlandicorum de arte medica*, fasc. XIV, p. xiii-xxxviii, 1-31, 1937. ISIS

Introduction in Dutch and English by M. A. VAN ANDEL, followed by the "Capita nonnulla de ventris fluxibus, de dysenteria, de lue indica, de ipecacuánha" in Latin and English. This refers to Brazil. Bibliography.
G. S.

Rhyne, Wilhelm ten (1649-1700). De lepra asiatica, Amsterdam, 1687. *Opuscula selecta Neerlandicorum de arte medica*, fasc. XIV, p. xxxix-li, p. 34-113, 1937. ISIS

This reprint after two centuries and a half of TEN RHYNE's treatise on Asiatic leprosy will draw attention to one of the Dutch fathers of tropical medicine. An introduction in Dutch and English has been contributed by D. SCHOUTE. This is followed by the introduction and first two chapters of TEN RHYNE's book written in Batavia between 1682 and 1686. "TEN RHYNE's great merit in his fight against leprosy is his definite attempt to mark out the lines of distinction between the many forms of the dreaded disease, and then to describe them with their symptoms, very specially emphasizing the initial stadia. In his introduction TEN RHYNE clearly expressed the hope that he had thus rendered a service to science, at the same time lessening the danger of a too lighthearted or incorrect diagnosis, which would lead to such cruel consequences for those concerned. TEN

RHYNE's opinion expressed in the introduction, that he was not free to enliven his description with nosographies for fear of, by doing so, harming the patients and their families, is remarkable at a time in which it was always the custom in such descriptions to mention the name, place of abode and profession of the persons concerned. TEN RHYNE probably thought of the social relations in the very small European community at Batavia, where everyone knew everyone else without any further indication."

WILLEM TEN RHYNE's birthyear is apparently 1649, not 1647 as given, e.g., in *NNBW* (vol. 9, 861-63, 1933). G. S.

Silvette, Herbert. The doctor on the stage. Medicine and medical men in seventeenth century English drama. *Annals of medical history* 8, 520-40, 1936; 9, 62-87, 174-88, 264-79, 371-94, 1937. ISIS

Viets, Henry R. A brief rule to guide the common-people of New-England, how to order themselves and theirs in the small pocks, or measels (first published in 1677/8 reprinted in 1702 and 1721-22). By THOMAS THACHER. Facsimile reproductions of the three known editions with an introductory note. LIV+16 p. (*Bibliotheca medica Americana*, 1). Baltimore, Johns Hopkins Press, 1937 ($ 1.50). ISIS

Elaborate study of the document a facsimile of which was published and discussed in *Isis* 23, 389-405, 1935. G. S.

E. — *Alia*

Bring, Samuel E. "Suecia antiqua et hodierna." *Lychnos* 2, 1-67, illus. Uppsala, 1937 (in Swedish, with French summary). ISIS

Apropos of the admirable illustrated book *Suecia antiqua et hodierna* by ERIK DAHLBERGH (1625-1703). G. S.

Nicolson, Marjorie. MILTON and the telescope. *Journal of English literary history* 2, 1-32, 1935. ISIS

Continuation of the two studies registered below under astronomy. "The astronomical background of MILTON's early works was a heritage from the classics, not from science. As a young man, he never knew the excitement of his older contemporaries who, in youth, had read of a new cosmos which almost overnight disrupted the immutable heavens of ARISTOTLE. Yet every reader of *Paradise Lost* is aware of the fact that MILTON's imagination had been stimulated by astronomy, and more than one modern critic has pointed out the extent to which that astronomy was Copernican or Galilean."... "Unlike DONNE, whose mind also was clearly stirred by implications of the 'perspective glass,' MILTON's imagination, I am persuaded, was stimulated less by *books about* the new astronomy than by the *actual sense experience*

of celestial observation."... "In my attempt to prove this contention, I shall, even at the risk of repetition, first examine MILTON's early works, before his visit to Italy and—as I insist upon believing in spite of S. B. LILJEGREN!—to GALILEO; then I shall consider the possibility that his first telescopic observation occurred in Italy; and finally I shall attempt an analysis of those peculiarities of his mature work which seem to me to have been the result of his actual experience with the telescope." G. S.

Sarton, George. A seventeenth century Malay dictionary. Query no. 68. *Isis* 26, 451, 1937. ISIS

Apropos of RUMPHIUS' Malay discovery now lost. Answer to the query by C. OTTO BLAGDEN.

Vaz Diaz, A. M.; Van der Tak, W. G. SPINOZA, MERCATOR et autodidactus. Oorkonden en andere authenticke documenten betreffende des wijsgeers jeugd en diens betrekkingen. 110 p., 13 facs. 's Gravenhage, NIJHOFF, 1933. ISIS

C. R. DE ALBERT RIVAUD sous le titre; Documents inédits sur la vie de SPINOZA : *R. de métaphysique et de morale* 41, 253-62, 1934.

Wolfson, Harry Austryn. Some guiding principles in determining SPINOZA's mediaeval sources. *Jewish quarterly review*, 27, 333-48, 1937. ISIS

Wolfson, Harry Austryn. SPINOZA's mechanism, attributes, and panpsychism. *Philosophical review* 46, 307-14, 1937. ISIS

XVIIIth Century (whole and first half)

A. — *Mathematics*

Loria, Gino. Contributi matematici dati del D'ALEMBERT all' "Encyclopédie méthodique." III^e^ congrés international d'histoire des sciences, Actes, conférences et communications 146-60, Lisbon, 1936. ISIS

Marian, Victor. O editie clujană a compendiului lui CHR. WOLFF. *Gazeta matematică* 42, 120-23, 179-83, 1936. ISIS

Description de l'édition latine de 1773, faite à Cluj, de l'œuvre de CHR. WOLFF (1679-1754). P. S.

B. — *Physical sciences and technology*

Carvalho, Joaquim de. JACOB DE CASTRO SARMENTO et l'introduction des conceptions de NEWTON en Portugal. III[e] congrès international d'histoire des sciences, Actes, conférences, et communications, 95-8, Lisbon, 1936. ISIS

Cohen, Ernst; Cohen, W. A. T. DANIEL GABRIEL FAHRENHEIT (geb. zu Danzig 24 Mai 1686; gest. im Haag 16. Sept. 1736). Verhandelingen der koninklijke Akademie van wetenschappen te Amsterdam, afdeeling natuurkunde (eerste sectie) 16, 37 p., 13 fig., Amsterdam, 1936. ISIS

Brief but elaborate biography with various documents and facsimiles. G. S.

Friend, J. Newton. The origin of FAHRENHEIT's thermometric scale. *Nature* 139, 395-98, 1937. ISIS

Heym, Gerard. The *Aurea catena Homeri*. *Ambix* 1, 78-83, 1937. ISIS

"The view of nature which was advanced by PARACELSUS and others of his school had developed along two separate lines of thought. The first, rationalistic, and leading to the elaboration of modern science; the second, metaphysical, or, as we prefer to call it to-day, 'pneumatic,' further developing on the one hand into the theosophic school founded by BÖHME, and on the other hand into the school of practical metaphysics, which united with the existing alchemical tradition. The *Aurea Catena Homeri*, first published in 1723, affords the best example of the latter school of thought, and a proof that the victory of rationalism was not so complete, at first, as is popularly supposed to-day."

Meyer, Kirstine, Friend, J. Newton. OLE ROMER'S and FAHRENHEIT'S thermometers. *Nature* 139, 585-86, 1937. ISIS

Rainov, T.I. Theory and practice in the work of M. V. LOMONOSOV. *Sorena* no. 9, 9-21, port., map, 1936 (in Russian). ISIS

Written in commemoration of the 225th anniversary of the birth of LOMONOSOV (1711-65). A brief review of his scientific and technological activities. A map, reproduced in facsimile, illustrates LOMONOSOV's ideas of a "possible passage to the East Indies by way of the Siberian Ocean" (1763). A. P.

Schimank, Hans. DANIEL GABRIEL FAHRENHEIT, ein deutscher Vertreter technischer Physik. *Proteus* 2, 21-31, 1937. ISIS

C. — *Natural sciences.*

Brunet, Pierre. La notion d'évolution dans la science moderne avant LAMARCK. *Archeion* 19, 21-43, 1937. ISIS

" Ainsi donc MAUPERTUIS paraît bien avoir, le premier introduit, en biologie, de manière scientifique, la notion d'évolution : c'est à lui qu'il convient de faire remonter le courant dans lequel BUFFON s'insère, avant de le grossir de ses apports personnels, et de lui donner la force d'entraîner plus tard celui qui devait vraiment faire du transformisme une doctrine."

Engel, H. The life of ALBERT SEBA. *Svenska Linné-Sällskapet Årsskrift* 20, 75-100, figs., 1937. (In Swedish with English summary). ISIS

" Life of ALBERT SEBA, the famous apothecary well known to all naturalists as the founder of a rich museum of curiosities and the editor of the magnificent work *Thesaurus naturalium*. It is well known, that through the intercession of LINNAEUS his friend, the gifted Swedish ichthyologist PETER ARTEDI, was entrusted by SEBA with the task of describing his fishes."

Grape, Anders. ABRAHAM BÄCKS Utländska studieresa Hollandsvistelsen (Föredrag hållet vid Svenska Linné-Sällskapets höstsammankomst i Stockholm den 23 november 1936). *Svenska Linné-Sällskapets Årsskrift* 20, 101-28, 1937. (In Swedish with English summary). ISIS

" ABRAHAM BAECK, who became physician to the king of Sweden and president of the Board of Health, was during all his life LINNAEUS' most intimate friend, to whom he wrote hundreds of lettres. These letters have been published in the work just mentioned, and form one of the foremost sources of our knowledge of LINNAEUS *intime*. In his youth BAECK made extensive travels in the Netherlands, England, France and Germany, attending the lectures of the most famous professors of medicine and natural history of the age. His comprehensive diary and notes are still preserved in the library of the Swedish medical association. Dr. A. GRAPE, chief librarian of the University library of Upsala, has from this material given an account of BAECK's visit to the Netherlands, where he stayed from 1741 to 1742. The diarist gives interesting glimpses of important personalities he met with, e.g. B. S. ALBINUS, J. F. GRONOVIUS and GAUBIUS in Leiden, J. BURMANN in Amsterdam and others. In a forthcoming volume the author will describe BAECK's visits to the other countries."

Hunger, F.W.T., Penning, C. P. J. Het borstbeeld van LINNAEUS in het hortustorentje te Harderwijk en de beeldhouwer, die deze buste maakte. *Bijdragen tot de geschiedenis der geneeskunde* 17, 85-91, 1937. ISIS

Ocagne, Maurice d'. RÉAUMUR. *Revue des deux mondes* 107, 456-63, 1937. ISIS

Sernander, Rutger. Den Linnéanska botaniken i den engelska landskapsträdgården. *Svenska Linné-Sällskapets Årsskrift* 20, 172-84, 7 fig., 1937 (in Swedish with English summary). ISIS

"In a short paper, entitled 'Linnaean botany and the English landscape park,' R. SERNANDER points to the fact, that in the new park architecture, which under this name made its entrance on the continent at the end of the XVII and the beginning of the XVIII centuries the name of LINNAEUS has its place."

Stejneger, Leonhard. GEORG WILHELM STELLAR : pioneer of Alaskan natural history. xxiv+623 p. Cambridge, Harvard University Press, 1936. ISIS

Reviewed by M. F. ASHLEY-MONTAGU, *Isis* 27, 75-7, 1937.

Uggla, Arvid Hj. LINNÉ och BURMANNERNA. Föredrag vid Svenska Linné-Sällskapets vårsammankomst den 24 maj 1936. *Svenska Linné-Sällskapets Årsskrift* 20, 128-44, 1937. (In Swedish with English summary). ISIS

"Dealing with the lifelong friendship between LINNAEUS and JOHANNES BURMANN the Amsterdam botanist, a friendship carried on by BURMANN's son NICOLAAS LAURENS, who became the pupil of LINNAEUS at Upsala in 1760. The author has been able to utilize the correspondence of LINNAEUS with his Dutch friends, partly published by VAN HALL already in 1830, and now intended to form the most important part of the next volume of the great publication of his correspondence, that will soon appear."

D. — *Medical sciences*

Dorveaux, Paul. Apothicaires membres de l'Académie royale des sciences. IX. GUILLAUME FRANÇOIS ROUELLE. *R. d'hist. de la pharmacie*, déc. 169-86, 1933. ISIS

GUILLAUME FRANÇOIS ROUELLE, dit ROUELLE l'ainé, 1703-1770.

Freind, John (1675-1728). Query no. 66 by PHILIP SHORR, *Isis* 26, 451, 1937. ISIS

Ledoux-Lebard, R. La première planche anatomique en couleurs imprimée en France. *Bull. de la soc. franç. d'hist. de la méd.* 31, 109-15, 1937. ISIS

Waite, Frederick C. Medical degrees conferred in the American colonies and in the United States in the eighteenth century. *Annals of medical history* 9, 314-20, 1937. ISIS

E. — *Alia*

Berkeley. L'analyste. Traduit par ANDRÉ LEROY. xliv+80 p. Paris, Les Presses universitaires, 1936. ISIS

Ferran, C. BOILEAU DESPRÉAU, créancier de l'hotel-Dieu de Lyon, participant à la loterie de cet établissement à la fin du règne de LOUIS XIV. *Bulletin de la soc. franç. d'hist. de la méd.* 31, 71-82, 1937. ISIS

Lamm, Martin. SWEDENBORG. Préface de PAUL VALÉRY. Traduit du suédois par E. SÖDERLINDH. (Publications du fonds Descartes). xxiv+313 p. Paris, STOCK, 1936. ISIS

Nous avons parlé assez longuement de la personnalité et de l'œuvre extraordinaires de SWEDENBORG dans *Isis* 23, 458-67. Le livre de LAMM est consacré surtout à l'étude de la pensée religieuse et mystique de SWEDENBORG. L'absence d'un index, pour une œuvre aussi touffue et aussi richement documentée, est scandaleux. G. S.

Oppenheim, David. The library of DAVID OPPENHEIM. London, *Times Literary supplement*, p. 732, September 12, 1936. ISIS

Oseen, C. W. An EMANUEL SWEDENBORG manuscript. With an introduction by C. W. OSEEN. *Lychnos* 2, 248-70, Uppsala 1937 (in Swedish with English summary). ISIS

XVIIIth century (second half)

A. — *Mathematics*

Bessel-Hagen, Erich. JOSEPH LOUIS LAGRANGE anlässlich seines 200. Geburtstage. *Proteus* 2, 99-104, 1937. ISIS

Chiò, Felice. LUIGI LAGRANGE. *Il bollettino di matematica* p. xxix-xxxv, June 1937. ISIS

Dunnington, G. Waldo. JOHANN FRIEDRICH PFAFF. *National mathematics magazine* 11, 5 p., port., 1937. ISIS

Ionescu, Ion. Prima aritmetică tspărită în limba română. *Gazeta matematică* 41, 20-7, 1935. ISIS

Première arithmétique roumaine, imprimée à Vienne en 1777. P. S.

Lagrange, Joseph Louis (1736-1936). Recueil d'articles en commémoration du 200me anniversaire du jour de sa naissance. 140 p., port. Académie des sciences de l'URSS, Moscow, 1937 (en russe). ISIS

Sommaire : A. N. KRYLOFF : JOSEPH LOUIS LAGRANGE; N. IDELSON : Sur la mécanique de LAGRANGE; M. F. SOUBBOTIN : Les travaux astronomiques de LAGRANGE; N. G. TCHEBOTAREFF : Sur les travaux de LAGRANGE en algèbre et la théorie des nombres; L. S. POLAK : LAGRANGE et les principes variationnels en mécanique et en physique.

Marian, Victor. Tabla Tibetului. *Gazeta matematică* 41, 515-17 1936. ISIS

Dans la seconde arithmétique roumaine, de SINCAI, 1785, la Table de la multiplication est appelée *Tabla Tibetului*, nom dérivé du philosophe grec CEBES. P. S.

B. — *Physical sciences and technology*

Blokh, M. A. TORBERN BERGMAN. Vernadski "Festschrift", 1239-65, port., fig. Moscow, Acad. Sciences U.S.S.R., 1936 (in Russian, with abstract in Swedish). ISIS

Life and work of TORBERN OLAF BERGMAN (1735-1784), the Swedish chemist, mineralogist, and physicist. With valuable footnotes and a bibliography. A. P.

Cabanes, Charles. La grande querelle du verre de lampe : ARGAND, QUINQUET et les frères MONTGOLFIER (documents inédits). *La revue de France* 17, 434-55, 1937. ISIS

Houllevigue, L. LAVOISIER agronome. *Le temps*, p. 3, 30 mars 1937. ISIS

Speter, Max. JOH. CHRIST. POLYKARP ERXLEBEN, der erfolgreiche Bekämpfer des "Acidum pingue" — Interregnums in der Chemie (1775-76). *Isis* 27, 11-19, 1937. ISIS

C. — *Natural sciences*

Bettencourt Ferreira, J. Acêrca da "viagem filosófica" do Dr. ALEXANDRE RODRIGUES FERREIRA e da colonização portuguesa no Brasil (1783-1793). IIIe congrès international d'histoire des sciences, Actes, conférences et communications, 385-90, Lisbon 1936. ISIS

Campbell, Gordon. Captain JAMES COOK. 320 p. London, HODDER and STOUGHTON, 1936. ISIS

Reviewed by G. R. CRONE, *Geographical journal* 89, 288, 1937.

Crone, G. R. The COOK memorial at Point Venus, Tahiti. *Geographical journal* 89, 54-8, 1937. ISIS

"The conclusions to be drawn are : COOK's observations were made at Fort Venus, and not on the site of the present memorial; COOK does not appear to have set up any mark, and no references are made by early visitors to a mark left by COOK; the stone incorporated in the present memorial was associated by local tradition with COOK, but the origin of this tradition cannot now be determined; and the inscription on the brass plate is misleading." C. W. A.

Fränkel, Walter K. Bemerkung zur Arbeit SAUSER : Erfahrungen mit allgemeinen anatomischen Modellierübungen. *Wiener klinische Wochenschrift* no. 46, 1935. ISIS

Holmes, Maurice. An introduction to the bibliography of Captain JAMES COOK, R. N. 60 p. London, EDWARDS, 1936. ISIS

Reviewed by G. R. CRONE, *Geographical journal* 89, 287-88, 1937.

Lönnberg, Einar. Några ord om Doktor G. ROTHMANS "Mus gundi". *Svenska Linné-Sällskapets Årsskrift* 20, 44-6, ill., 1937. (In Swedish with English summary). ISIS

Meyer, Adolf. Ein wenig bekanntes Bildnis von LAMARCK. *Archiv für Geschichte der Medizin* 29, 355-56, 1 fig., 1937. ISIS

Roule, Louis. LAMARCK et l'interprétation de la nature. 247 p. Paris, FLAMMARION, N. D. ISIS

Reviewed by C. A. KOFOID, *Isis* 27, 77-8, 1937.

Schmid, Günther. LINNÉ im Urteil JOHANN BECKMANS, mit besonderer Beziehung auf F. C. MEDICUS. Neue Quellen. *Svenska Linné-Sällskapets Årsskrift* 20, 47-70, 1937. (In Swedish with English summary). ISIS

"One among the foreign pupils of LINNAEUS at Upsala was the German JOHANN BECKMANN, who became Professor of Economy at Göttingen. He visited LINNAEUS at Upsala and Hammarby in 1765-66, and during all his life he was a firm advocate of his botanic system in Germany."

Speter, Max. I. JAN INGEN-HOUSZ' "verbessertes" Sauerstoff-Inhalierungsgerät (1783-84) und dessen Ausgestaltung durch PASKAL JOSEPH FERRO (1783-84). II. PAYERNES Versuche und Patente (1842-43) zur Vergütung von Atemluft in hermetisch oder sonst atembehinderten Räumen durch Kohlensäureabsorption und komprimierten oder chemisch (aus Kaliumsuperoxyd bzw. Kaliumferrat) oder thermisch (aus Kaliumchlorat bzw. Mangansuperoxyd) entwickelten Sauerstoff 3/4. Auflage. Die 1. Aufl. erschien 1934, zum 4. Intern. Rettungs-Kongress, Kopenhagen. 31 p. (*Wissenschaftliche Mitteilungen des Drägerwerks*, H. 5). Lübeck, 1936. ISIS

D. — *Medical sciences*

Artelt, Walter. JEAN PAULS "Dr. KATZENBERGER" und die Medizin des 18. Jahrhunderts. *Die medizinische Welt*, Nr. 41, 8 p., 1936. ISIS

Baumgartner, Leona. JOHN HOWARD and the public health movement. *Bulletin of the institute of the history of medicine* 5, 489-508, 4 fig., 1937. ISIS

Dorveaux, Paul. Apothicaires membres de l'Académie royale des sciences. X. LOUIS CLAUDE CADET, dit CADET DE GASSICOURT. *R. d'hist. de la pharmacie*, 385-97, port., déc. 1934; 1-13, mars 1935. ISIS

LOUIS CLAUDE CADET, 1731-1799; membre de l'académie des sciences en 1766.

Goldsmith, Margaret. FRANZ ANTON MESMER. The history of an idea. 282 p. London, BARKER 1934 (5 s.). ISIS

Good account, well documented and well balanced, but containing nothing new. The author traces the sources of MESMER's thought and the continuation of his influence down to Mrs. EDDY and FREUD. The author's characterization of MESMER is fair and generous. G. S.

Jameson, Edwin M. JOHN LEAKE and childbed fever. *Annals of medical history* 9, 211-18, 1 fig., 1937. ISIS

Morgan, John. A discourse upon the institution of medical schools in America. With an introduction by ABRAHAM FLEXNER. vi + vii + xxviii + 63 p., port., facs. (Publications of the Institute

of the history of medicine, the Johns Hopkins University, fourth series, Bibliotheca medica Americana 2). Baltimore, Johns Hopkins Press, 1937 ($ 2.00). ISIS

Says Dr. A. FLEXNER in his preface : " MORGAN's Discourse shows that he possessed a keen and penetrating eye for the essentials. He realized, for example, the importance of specialization. He knew that an internist, a surgeon, and an apothecary have different tasks and require different training. He realized the necessity of a sound preliminary education in literature and science and the standards which he advocated in 1765, soon to be forgotten, were not really revived until The Johns Hopkins Medical School was opened in the early 1890's, over a hundred years later. He saw the fundamental importance of training in anatomy, physiology, chemistry, and physics, on the basis of which alone clinical medicine could be cultivated. He knew that a medical school must control adequate hospital facilities and finally that the medical faculty should be an integral part of a college or a university. He emphasized the importance of study abroad. It required not only a high order of intelligence but an equally high order of courage for a young man to return to the American colonies prior to the American Revolution and set up an ideal such as MORGAN created in his memorable address. Professor SIGERIST has done well to brush the dust from the pages upon which its words are written, and medical students today cannot do better than to cherish the noble views of their profession, both educational and scientific, formulated with dignity and learning by the first American professor of medicine."

Pallary, Paul. Les rapports originaux de LARREY à l'armée d'Orient. viii+85 p. (*Mémoires de l'Institut d'Egypte*, 30). Le Caire, Imprimerie de l'Institut français d'archéologie orientale, 1936. ISIS

Ces documents d'archives complètent, sans grande nouveauté, la " Relation historique et chirurgicale de l'expédition de l'Armée d'Orient en Égypte et Syrie " que DOMINIQUE JEAN LARREY (1768-1842) publia en 1803, et " l'Histoire médicale de l'Armée d'Orient " que DESGENETTES fit paraître en 1802. L'édition a été faite avec un soin minutieux, l'orthographe fantaisiste de LARREY étant reproduite dans tous ses détails. On sait que NAPOLEON I^{er} dans son testament a dit du Baron LARREY que c'était le plus honnête homme qu'il avait trouvé. Cela est à l'éloge des deux, car il dû y avoir des conflits en Égypte entre le général en chef et le chirurgien. Voir *Isis* 26, 465-470.
G. S.

Ransom, John E. JOHN HOWARD on communicable diseases. *Bulletin of the Institute of the history of medicine* 5, 131-47, 1937. ISIS

Sandra, H. Sprokkelingen betreffende de inenting tegen pokken in ons land omstreeks 1800. *Bijdragen tot de geschiedenis der geneeskunde* 17, 103-11, 1937. ISIS

Vinchon, Jean. MESMER et son secret. Préface de LEVY-VALENSI. 121 p., illus., Paris, LEGRAND, 1936. ISIS

Étude fort bien documentée sur MESMER, ses disciples et ses contradicteurs. G. S.

E. — *Alia*

Charles-Roux, Francois. BONAPARTE, gouverneur d'Egypte. 383 p., 25 fig., 1 map. Paris, PLON, 1935. ISIS

Reviewed by GEORGE SARTON, *Isis* 26, 465-70, 1937.

Dawson, Christopher. EDWARD GIBBON. (Annual lecture on a master mind, Henriette Hertz Trust). *Proceedings of the British Academy* 20, 159-80, 1934. ISIS

Dehérain, Henri. Le rayonnement de SILVESTRE DE SACY. *Journal des savants* 264-80, 1936; 17-32, 1937. ISIS

Fages, Pedro (d. 1796). A historical, political, and natural description of California. Written for the Viceroy in 1775. Translated by by HERBERT INGRAM PRIESTLEY. xi + 83 p. Berkeley, University of California Press, 1937 ($ 1.50). ISIS

"The document here rendered into English is one of the earliest descriptions of California. It comes from the pen of one of the participants in the first expedition of the Spaniards to Monterey in 1769, and possesses the value of having been composed just at the close of the author's first period of activity in California; it is thus free from the burdensome detail of an actual diary, and yet is not characterized by the vagueness and unreliability common to reminiscences." "FAGES' description of the California Indians is recognized as of first importance to ethnology."

The edition of this classic of Californian history is beautifully printed, a pleasure to the eye. The original ms. is preserved in the Mexican archives in Mexico. The Indian vocabulary from San Luis Obispo, has been added to the original text from a copy of it in the archives of Seville. The translation was first published in the *Catholic historical review* (1919). This is thus a second edition. G. S.

Hildebrand, Bengt. Le Cardinal STEFANO BORGIA et la Suède. *Lychnos* 2, 112-29, 1 fig., Uppsala 1937 (in Swedish with French summary). ISIS

Laboulle, M. J. J.; Levy, H. Some questions of scientific method in the "siècle des lumières". *Annals of science* 2, 153-63, 1937. ISIS

XIXth century (whole and first half)

A. — *Mathematics*

Bowditch, Nathaniel (1773-1838). A catalogue of a special exhibition of manuscripts, books, portraits and personal relics. iv + 40 p., 7 pl. Peabody Museum, Salem, Massachusetts from 15th May to 15th September 1937 ($ 1). ISIS

This beautifully printed catalogue contains a preface by WALTER MUIR WHITEHILL, a biography by HAROLD BOWDITCH, a study on BOWDITCH's scientific achievements by RAYMOND CLARE ARCHIBALD, and a bibliography prepared by the same, which means with loving care. Seven fine plates reproduce various portraits. A splendid memorial publication, for which the people of Salem as well as the authors deserve congratulation. G. S.

Dunnington, G. Waldo. B. F. THIBAUT (1775-1832), early master of the art of teaching and popularizing mathematics. *National mathematics magazine* 11, 7 p., port., 1937. ISIS

Dunnington, G. Waldo. CARL FRIEDRICH GAUSS. Inaugural lecture on astronomy and papers on the foundations of mathematics. Translated and edited. xi+91 p. Baton Rouge, 1937. ($ 1) ISIS

This little book published on the occasion of the second centenary of the University of Göttingen is devoted to GAUSS who played an important part in the first centenary. It contains the following items : a biography of the early life of GAUSS down to 1803 by the author, partly based on research in the GAUSS Archive in Göttingen; then the translation of two unknown writings by GAUSS, *The foundations of mathematics* (early) and his *Inaugural lecture on astronomy* (1808-?), together with notes. G. S.

Lebesgue, Henri. Sur une construction du polygone régulier de 17 côtés, due à ANDRÉ-MARIE AMPÈRE, d'après des documents conservés dans les Archives de l'Académie des sciences. *C. R. hebd. des séances de l'Ac. des sc.* 204, 925-28, 1937. ISIS

Marian, Victor. Scrierile matematice ale lui G. LAZĂR. (1821). *Gazeta matematică* 41, 414-19, 460-62, 1936. ISIS

Marian, Victor. Aritmetica lui G. OBRADOVICI. *Gazeta matematică* 42, 337-41, 1937. ISIS

Quatrième arithmétique roumaine connue (1805). P. S.

B. — *Physical sciences and technology*

Esposito, Antonio. Una pagina di storia della tossicologia. I cento anni dell'apparecchio di MARSH. *Rivista di storia delle science mediche* 28, 99-102, 1937. ISIS

Findlay, Alex. Use of the name "racemic acid". *Nature* 140, 22, 1937. ISIS

" The author of the term *racemic acid* is GAY-LUSSAC. The first occurrence of the term in print is found in a publication, " Cours de chimie par M. GAY-LUSSAC, comprenant l'histoire des sels, la chimie végétale et animale," published in Paris by PICHON et DIDIER, in 1828."

Humphreys, A. W. The development of the conception and measurement of electric current. *Annals of science* 2, 164-78, 1937. ISIS

Ionescu, Ion. A. M. AMPÈRE. *Gazeta matematică* 41, 508-15, 553-58, 601-06, 1936. ISIS

Ockenden, L. C. The great batteries of the London Institution. *Annals of science* 2, 183-84, 1937. ISIS

Speter, Max. Klärung der Multiplikator-Prioritätsfrage SCHWEIGGER-POGGENDORFF. *Zeitschrift für Instrumentenkunde* 57, 4 p., 1937. ISIS

" Die vom Internationalen Prioritäten-Büro in Paris aufgeworfene bzw. in dessen Vertretung durch MARIO GLIOZZI in Turin betreute Frage, wer von den beiden Deutschen, SCHWEIGGER oder POGGENDORFF, den elektro-magnetischen Multiplikator erfunden bzw. dessen Prinzip entdeckt hat, wurde nachstehendes Judizium MAX SPETERS geklärt, das wir mit Genehmigung von Prof. GLIOZZI wiedergeben."

Speter, Max. Photohistorica antiqua-nova varia. *Photographische Korrespondenz* 73, 33-7, Wien, no date. ISIS

Contents. 1. DAGUERRES übersehenes Papiersubstrat-Photographier-Verfahren von 1826-1839; 2. DONNÉS mikroskopische Untersuchung des Daguerréotyps; 3. DAGUERRES unbefriedigende Direkt-Positivbilder mit Kohlensäuragasfixierung; 4. DAGUERRES befriedigende Fixierergebnisse mit Chlorat-Sauerstoffgas; 5. LASSAIGNES Direkt-Positivbildfixierung von Chlorsilberbildern mit Kaliumjodid und TALBOTS Prioritätenleumund; 6. Baron SÉGUIER, der erste photographische " Dreifüssler " und der erste photographische " Dunkelmann "; 7. Das erste Totenphoto; 8. Das erste Auftauchen der Ausdrücke Daguerreotyp, Photographie, Lichtbild, Lichtzeichnung.

Terrey, Henri. EDWARD TURNER, M. D., F. R. S. (1798-1837). *Annals of science* 2, 137-52, 1 pl., 1937. ISIS

Weeks, Mary Elvira; Dains, F. B. Mrs. A. H. LINCOLN PHELPHS and her services to chemical education. *Chemical education* 14, 53-7, 4 fig., 1937. ISIS

Yamamoto, Issei. KUNITOMO and his astronomical activities in the pre-Meizi era. *Isis* 26, 330-35, 3 fig., 1937. ISIS

KUNITOMO NOOTOO (or TOOBEI) was born in Omi, Japan 1778. He built for himself a Gregorian telescope in 1832, and made a remarkable series of sunspot observations in 1835-1836. He died in 1841. G. S.

C. — *Natural science*

Leoncini, Francesco. Nel centenario della morte di GEROLAMO SEGATO (1792-1836) (La commemorazione di GEROLAMO SEGATO tenuta alla Società medico fisica Fiorentina, cento anni addietro, dal Dottore FEDERIGO ERMANNO FILIPPI). *Rivista di storia delle scienze mediche* 28, 38-52, 1937. ISIS

Lindenbein, Werner. Entstehung der ersten "Biologie" unter dem Einfluss der deutschen Naturphilosophie. *Proteus* 2, 92-98, 1937. ISIS

Lippmann, Edmund O. von. Ein brief MATHIEU DE DOMBASLE's aus dem Jahre 1817. *Die Deutsche Zuckerindustrie* Nr 19, 45, 1937. ISIS

N., F. J. MACCULLOCH's geological map of Scotland. *Nature* 139, 974, 1937. ISIS

Oudemans, A. C. Kritisch historisch overzicht der acarologie. Derde Gedeelte, 1805-1850, Band D, Parasitengona Oudms. V, 1909. Met 332 figuren in den tekst. xix + p. 1349-1998. Leiden, BRILL, 1937. ISIS

Continuation of OUDEMAN's monumental work the first volumes of which were reviewed in *Isis* 15, 381-86.

Speter, Max. Die "Buss(e)ru(h)n" — Gewand-Taucher-Maschine PETER KREEFTS in Barth (1800-1805). Ein verschollener Blasebalg-

Frischluft-Tauchapparat. Kreeft-Broschüre, aus dem Draegen Hefte, 3 p., 4 fig., Lübeck, 1937. ISIS

Speter, Max. Streifzug auf einige Typen von Frei- bzw. Filter- Frischluft- und Kreislauf-Atemapparaten des 19. Jahrhunderts. 1. Ausgabe. (*Wissenschaftliche Mitteilungen des Drägerwerke*, H. 13). Lübeck, 1937.

D. — *Medical sciences*

Bernard, L. Un sous-aide-major de la grande Armée. *Bulletin de la société française d'histoire de la médecine* 31, 49-51, 1937. ISIS

"Ce mémoire est la reproduction d'un manuscrit écrit par un médecin périgourdin, GABRIEL BESSE-LALANDE, né à Paunat en Périgord en 1785, décédé en 1853, sous-aide-major à la grande armée et médecin de campagne."

Delaunay, P. MOREAU DE LA SARTHE et ses souvenirs. *Bull. de la société française d'histoire de la médecine* 30, 353-62, 1936; 31, 13-42, 1937. ISIS

Faucci, Ugo. In memoria di AGOSTINO BASSI (1773-1856) (Nel 1° centenario del "... Mal del Segno") (1835-1935) (Continuazione v. nn. 5-6, anno corrente, p. 153). Le scoperte del "Trichophyton" e del "Microsporum audouini". *Rivista di storia delle scienze mediche* 27, 286-326, 371-423, 1936; 28, 24-37, 1937. ISIS

Fränkel, Walter K. Zur Erinnerung an SEMMELWEIS. *Zentralblatt für Gynäkologie*, Nr 39, 2309-11, 2 fig., 1935. ISIS

Godlewski, Henri. L'étudiant en médecine PHILIPPE BUCHEZ (1796-1865), fondateur du Carbonarisme français. *Bulletin de la société française d'histoire de la médecine* 31, 43-8, 1937. ISIS

Hall, Courtney Robert. Doctors and the practice of medicine in early Nassau County, N. Y. *Annals of medical history* 9, 168-73, 1937. ISIS

Hönncher, E. Der Mediziner GOTTHILF HEINRICH SCHUBERT (1780-1860) und die Psychologie der Romantik. *Klinische Wochenschrift* 15, 6 p., 1936.

Magath, Thomas B. The history of steam sterilization. *Annals of medical history* 9, 338-44, 1937. ISIS

Miller, William Snow. JOHN DAVIDSON GODMAN. *Annals of medical history* 9, 293-303, 2 fig., 1937. ISIS

Nuyens, B. w.Th. Brieven van Dr. J. C. DE MAN aan zijn vader. Relaas van zijn studiereis naar Parijs en Weenen in 1842. *Bijdragen tot de geschiedenis der geneeskunde* 17, 68-72, 2 pl., 1937. ISIS

Paladini, Pantaleo. Il bisturi olivare di FRANCESCO DA CAMINO. *Rivista di storia delle scienze mediche* 28, 103-05, 1 fig., 1937. ISIS

Randall, Alexander. PHILIP SYNG PHYSICK's last major operation. *Annals of medical history* 39, 133-41, 1937. ISIS

Silin, Charles I. Early medical legislation in Louisiana and a state medical board examination in 1816. *Bulletin of the institute of the history of medicine* 5, 667-80, 1937. ISIS

St-Martin, Alexis. Four letters of ALEXIS ST-MARTIN. 8 p. Ann Arber, William L. Clements Library, 1937. ISIS

This is a very interesting footnote to the story of WILLIAM BEAUMONT, one of the most interesting episodes in the history of American medicine (see *Isis* 13, 471). G. S.

E. — *Alia*

Armstrong-Jones, Sir Robert. The poet KEATS' trip to Scotland. *Annals of medical history* 9, 101-10, 1937. ISIS

Blanché, Robert. Le rationalisme de WHEWELL. 224 p. Paris, ALCAN, 1935. ISIS

Dawson, Warren R. PETTIGREW's demonstrations upon mummies. A chapter in the history of Egyptology. *Journal of Egyptian archaeology* 20, 170-82, 2 pl., 1934. ISIS

"The year 1934 is the centenary of the publication of a very remarkable work, the *History of Egyptian Mummies* of THOMAS JOSEPH PETTIGREW, F.R.S. The work is really, for its time, a very learned and valuable contribution to science, and it was, in fact, the first book on Egyptian archaeology published in this country. In making this statement, I of course exclude the fantastic attempts at decipherment and other works of the pre-CHAMPOLLION era, and likewise books of travel and descriptive works. Thus qualified, PETTIGREW's book stands as the first British scientific contribution to Egyptian archaeology, for it covers a considerably wider field than its title suggests

and ranges over the entire domain of funerary archaeology so far as it was then known and understood."

Ducassé, Pierre. AUGUSTE COMTE et GASPARD MONGE. 1. Le témoignage d'AUGUSTE COMTE et le réveil des espérances positives; 2. A la mémoire de GASPARD MONGE. 15 p. Paris, 1937. ISIS

Ducassé, Pierre. Méthode positive et méthode cartésienne. *Revue de synthèse* 14, 51-66, 1937. ISIS

" Nous nous proposons, dans les pages qui vont suivre, de poser très schématiquement le problème logique des rapports que le positivisme d'AUGUSTE COMTE entretient avec le cartésianisme. Plus étroitement encore, d'établir entre l'inspiration de COMTE et certaine attitude, authentiquement cartésienne, qu'il a su reprendre et prolonger, un mode naturel de filiation..." " On voit ainsi, dans le domaine de la philosophie de l'histoire, par conséquent au pôle, en apparence le plus étranger au rationalisme anti-historique de DESCARTES, par quelle curieuse mais naturelle génération l'esprit cartésien se trouve à la fois l'initiateur et le témoin permanent des révolutions de l'esprit positif, en tant que l'esprit positif déborde les normes et les critères du cartésianisme. Cette curieuse situation d'extériorité et d'inhérence simultanées, que nous avons dû trop brièvement décrire, s'impose à notre réflexion contemporaine avec une évidence très pressante : la crise du positivisme, et la crise de l'esprit cartésien, en tant que liées, et en tant que relativement indépendantes, nous obligent, en effet, à approfondir le rapport relatif de ces deux héritages, et leur rapport commun à notre philosophie. Et, à vrai dire, ces études ne sont que deux faces d'un même problème : Apprécier, à leur juste prix, les contradictions nécessaires que l'expérience contemporaine oppose aux approximations successives de la philosophie positive; distinguer, dans la mort apparente des doctrines, la filiation vivante et l'avenir fécond des intuitions méthodologiques; ne pas laisser obscurcir par les difficultés journalières de l'objectivation scientifique, quelques profondes, fructueuses idées directrices, par rapport auxquelles notre science contemporaine devra définir, elle aussi, son esprit et ses ambitions."

Gouhier, Henri. La vie d'AUGUSTE COMTE. 3e éd., 300 p., port. (Vies des hommes illustres, 63). Paris, GALLIMARD, 1931. ISIS

Reviewed by GEORGE SARTON, *Isis* 26, 470-77, 4 fig., 1937.

Gouhier, Henri. La jeunesse d'AUGUSTE COMTE et la formation du positivisme. II. SAINT-SIMON jusqu'à la Restauration. 388 p. (Bibliothèque d'histoire de la philosophie). Paris, VRIN, 1936. ISIS

" L'étude de la formation du positivisme tourne autour des six années passées par AUGUSTE COMTE dans l'intimité de SAINT-SIMON. Il faut donc savoir qui était COMTE avant de rencontrer le directeur de *L'Industrie* et qui était SAINT-SIMON avant de prendre le jeune homme pour secrétaire.

Le tome I de cet ouvrage répond à la première exigence et le présent volume à la seconde; le dernier sera consacré à la période où les deux vies relèvent d'une biographie commune." Le tome I a été analysé assez longuement dans *Isis* 26, 470-7. Le tome II est une biographie de SAINT-SIMON très détaillée, exacte, intelligente, Toutes les sources sont minutieusement indiquées, analysées, apprécisées. L'ouvrage est rempli d'aperçus intéressants pour l'histoire de la science française après la Révolution. L'auteur conclut : " Ce n'est pas SAINT-SIMON mais les Saint-Simoniens qui ont fait le Saint-Simonisme et c'est à peine SAINT-SIMON qui a fait les Saint-Simoniens." (p. 346). " Justement obscur sous le Consulat et l'Empire, SAINT-SIMON eut sur d'autres, plus illustres, la supériorité de ne pas vieillir; c'est à ce privilège qu'il doit de leur survivre. Si l'histoire de la philosophie était seulement celle des idées, elle laisserait ce raté magnifique aux amateurs de biographies pittoresques. Mais, dans le cours mouvementé de l'intelligence, nous ne rencontrons pas seulement ceux qui inventent les idées et ceux qui savent les assembler : il y a aussi ceux qui ont la puissance de les transformer en *idéal*" (p. 348). " SAINT-SIMON est cet homme dont le dynamisme intérieur crée autour de lui une zône de pensée vibrante. Les idées qui dansent dans sa tête sont les thèmes pré-positivistes. La chaleur qui les rend rayonnantes est l'espérance révolutionnaire. Les cinquante-cinq premières années de sa vie révèlent et ce rassemblement des idées et l'énergie qui les transforme en idées-forces. Le rassemblement ne cessa jamais d'être un bouillonnement, mais l'énergie demeurait intacte et c'est comme professeur d'énergie que SAINT-SIMON entre dans le XIX^{e} siècle " (p. 349). G. S.

Henriot, Emile. MUSSET, LEBRUN et les comètes. *Le temps* no. 27508, 3, 29 décembre 1936. ISIS

Hildebrand, Bengt. Une lettre (1827) de CHAMPOLLION sur les pétroglyphes du Nord. *Lychnos* 2, 369-72, Uppsala 1937 (in Swedish with French summary). ISIS

" CHAMPOLLION fut élu membre de l'Académie des Antiquités à Stockholm en dec. 1826. Le secrétaire de l'Académie, J. G. LILJEGREN, l'informant de cet élection, émit lui aussi une théorie pour expliquer les pétroglyphes du Nord. CHAMPOLLION y répondit dans une lettre (janv. 1827), publiée ici."

Marvin, Francis Sydney. COMTE. The founder of sociology. 216 p., frontispiece. (Modern sociologists). London, CHAPMAN and HALL, 1936.

Reviewed by GEORGE SARTON, *Isis* 26, 470-77, 4 fig., 1937.

Oseen, C. W. Un historien suédois des sciences de l'époque romantique. *Lychnos* 2, 68-78, Uppsala 1937 (in Swedish with French summary). ISIS

Apropos of Baron F. W. VON EHRENHEIM, who published a large treatise on "Naturphilosophie" in 1822, including an account of the history of science, chiefly from the philosophical point of view. G. S.

XIXth century (second half)

A. — *Mathematics*

Bortolotti, Ettore. SALVATORE PINCHERLE. *Bollettino dell' Unione matematico italiana* 16, 37-60, 1937. ISIS

Yates, R. C. SYLVESTER at the University of Virginia. *American mathematical monthly* 44, 194-201, 1937. ISIS

B. — *Physical sciences and technology*

Armstrong, Eva V. The story of the EDGAR FAHS SMITH memorial collection in the history of chemistry. 21 p., port. University of Pennsylvania, 1937. ISIS

Beautiful booklet explaining the value of that collection for students of the history of chemistry. For an account of the life of the beloved EDGAR FAHS SMITH (1854-1928) see the article by CHARLES ALBERT BROWNE (*Isis* 11, 375-84, portrait, 1928). G. S.

Blokh, M. A. Life and work of VAN'T HOFF. *Priroda* 25, no. 11, 118-27, port., 2 fig., 1936 (in Russian). ISIS

A valuable paper containing a considerable amount of unpublished material, with biographical and bibliographical notes on VAN 'T HOFF and some of his contemporaries (e.g., JOSEPH ACHILLE LE BEL, 1847-1930). A. P.

Branly, Étienne. La découverte de la T. S. F. *Mercure de France* 278, 610-15, 1937. ISIS

Breunig, Erwin. Deutschlands Anteil an der Entwicklung des Rundfunks. *Proteus* 2, 41-7, 1937. ISIS

Cannizzaro, Stanislao. Alcune lettere inedite di STANISLAO CANNIZZARO ad ADOLF LIEBEN. *Archeion* 18, 355-65, 1936 (received 1937). ISIS

Chavanne, Georges. Notice sur la vie et les travaux de VICTOR GRIGNARD *Rapport de l'Université de Bruxelles sur l'année académique* 1935-1936, p. 82-4, Bruxelles, 1937. ISIS

Costanzo, Giovanni. La chronologie de l'anneau électromagnétique (l'invention de A. PACINOTTI). III[e] congrès international d'histoire des sciences, Actes, conférences et communications, 179-90, Lisbon, 1936. ISIS

Dubrisay, René. HENRY LE CHATELIER, 1850-1936. *L'enseignement scientifique* 10, 193-97, 1937. ISIS

Fränkel, Walter K. RÖNTGEN-Erinnerung. *Röntgenpraxis* 6, 1 p., 1934. ISIS

Jaumotte, J. EUGÈNE LAGRANGE (1855-1936). *Ciel et terre* 14 p., port., 1937. ISIS

Kennelly, Arthur-Edwin. Remise de la médaille MASCART. 14 p., illus. Paris, Société française des électriciens, 1936. ISIS

Includes biography of the great electrician who in his famous paper of 1893 on impedance used imaginary quantities for the extension of OHM's law to alternating currents. The KENNELLY-HEAVISIDE layer is named after him and OLIVER HEAVISIDE (1850-1925), his paper on the subject appearing in 1902. G. S.

Liesegang, F. Paul. Die Stellung Deutschlands in der Entwicklungsgeschichte der Kinematographie. *Proteus* 2, 31-41, 1937. ISIS

Orrok, George A. Engineering recollections, 1868-1898. 34 p. The Newcomen Society, American Branch, 1937. ISIS

Pelseneer, J. Catalogue sommaire des manuscrits du fonds Stas de l'Université libre de Bruxelles. *Bulletin de la société chimique de Belgique* 46, 10 p., 1937. ISIS

MSS. writings of the great Belgian chemist JEAN SERVAIS STAS (1813-1891). G. S.

Sarton, George. The discovery of X-rays. With a facsimile reproduction (no. XVIII) of RÖNTGEN's first account of them published early in 1896. *Isis* 26, 349-69, 1937. ISIS

Speter, Max. Ein "Kampfstoffler" von 1856. *Œsterreichisches Rettungswesen* Dezember 1936, p. 3. ISIS

Squires, J. Duane. Aeronautics in the Civil War. *American historical review* 42, 652-69, 1937. ISIS

Thomson, Sir J. J. Recollections and reflections. viii + 451 p. 10 illus. London, BELL, 1936 (18 s.). ISIS

This is not a full autobiography, but a collection of autobiographical fragments mixed with many portraits of other scientists, such as FRANKLIN, CAVENDISH, JOULE, the third lord RAYLEIGH, MAXWELL and a whole series of Trinity men. " J. J. " 's accounts of the older men, such as FRANKLIN, are taken from well known books, yet his appreciations of them are very precious. As to the men whom he has known personally his accounts of them are invaluable. Contents : 1. Boyhood and Owens College; 2. Undergraduate days : Cambridge then and now; 3. Cambridge, 1879-1884; 4. The Cavendish laboratory—and professorship of experimental physics; 5. Psychical research; 6. First and second visits to America, 1896, 1903; 7. Visits to Canada and Berlin; 8. War work—Cambridge during the War; 9. Visit to America in 1923; 10. Some Trinity men; 11. Discharge of electricity through gases; the discovery of the electron; positive rays; 12. Physics in my time. The appendix, instead of containing the usual (and meaningless) list of honours, contains two other lists incomparably more impressive, to wit, the list of " J. J." CAVENDISH students who have become F.R.S., and the list of Universities in which his pupils have held professorships. This second list is incredibly long; it shows that " J. J." 's intellectual children are scattered all over the world. These " Recollections " revealed to me, among many other things, the author's deep interest in psychical research (see p. 147-163, 298, 379-83), his attitude being one of openminded and expectant agnosticism. G. S.

C. — *Natural sciences*

Brooks, William Keith (1848-1908). Obituary by R. P. BIGELOW. *Proceedings of the American Academy of Arts and Sciences* 71, 389-492, 1937. ISIS

Cowles, Thomas. MALTHUS, DARWIN, and BAGEHOT : a study in the transference of a concept. *Isis* 26, 341-48, 1937. ISIS

"A familiar phenomenon in the history of science is the transference of a concept from one field of investigation to another. At present the newer concepts in use in physics are being applied in the social sciences. The classic example of this transference phenomenon is the concept of evolution; originating in the social sciences, it was taken over into biology and thence to the whole range of current thought. This paper aims at tracing the use of one idea — the struggle for existence — by MALTHUS in 1798 in an attempt to solve a problem in economics and politics, its elaboration by DARWIN sixty years later into the theory of natural selection for the purpose of solving a problem in biology, and the immediate application of the combined doctrines by WALTER BAGEHOT in an effort to solve the problem of social change."

Demoor, Jean. Notice sur la vie et les travaux de CHARLES RICHET.

Rapport de l'Université libre de Bruxelles sur l'année académique 1935-1936, Bruxelles, 1937, p. 79-81. ISIS

Demoor, Jean. Notice sur la vie et les travaux de YVAN PAVLOW. *Rapport de l'Université libre de Bruxelles sur l'année académique* 1935-1936, Bruxelles, 1937, p. 90-92. ISIS

Grosu, Alexandru. Naturalistul I. P. LICHERDOPOL (1842-1908). *Revista, ştiinţifică Adamachi* 22, 32-37, 1936. ISIS

(Langerhans, Paul). Contributions to the microscopic anatomy of the pancreas by PAUL LANGERHANS (Berlin 1869). Reprint of the German original with an English translation and an introductory essay by H. MORRISON. *Bulletin of the institute of the history of medicine* 5, 259-97, 1 pl., 1 fig., 1937. ISIS

Ruede, Howard. Sod-house days. Letters from a Kansas homesteader 1877-78. Edited by JOHN ISE. xii + 248 p. New York, Columbia University Press, 1937 ($ 2.75). ISIS

This is the fourth volume in the Columbia University studies in the history of American agriculture edited by H. J. CARMAN and R. G. TUGWELL. It is a source book of pioneer agriculture in the days of the covered wagon on the edge of the even then incipient dust bowl of the Great Plains written by an exceptionally observant participant in the transition from the bunch grass and the bison to domesticated animals and cereal crops C. A. K.

Sarton, George. DARWIN's conception of the theory of natural selection (After an unpublished letter of 1861). *Isis* 26, 336-40, 1 facs., 1937. ISIS

Seurat. L. G. EMILE MAUPAS. *Bull. de la société d'histoire naturelle de l'Afrique du Nord* 7, 318-23, 1916. ISIS

Speter, Max. Der erste lungenautomatische Druckreduzier-Frischluft-Atemapparat : System Rouquayrol-Denayrouze (1860 ff.) Mit Anhang : Ein uhrfederwerk-automatischer Frischluft-Atemapparat von FRÉMINET in Paris (1773-1776). 1. Ausgabe. 43 p., 16 fig. (*Wissenschaftliche Mitteilungen des Drägerwerks*, H. 12). Lübeck, 1937. ISIS

Uggla, Arvid Hj. Linnéforskaren EWALD ÅHRLING. Ett hundraårsminne. *Svenska Linné-Sällskapets Årsskrift* 20, 1-3, 1937. (In Swedish with English summary). ISIS

"The Yearbook opens with a short memoir by the Editor of Dr. EWALD ÄHRLING, who was born a hundred years ago, and died in 1888 at the age of fifty. ÄHRLING, who held the humble position of a teacher at the Latin Grammar school at Köping, early devoted himself to investigations in matters concerning his great countryman LINNAEUS. He rendered great service in publishing for the first time the accounts of his early voyages and his botanic MSS, the literary remains of young LINNAEUS. At that time only the *Iter Lapponicum*, in an English translation, published by Sir JAMES EDWARD SMITH in 1811, had come before the public eye. He was also the first Swede to obtain a thorough knowledge of the Linnaean MSS, preserved in the Linnean Society of London, during his visit there in 1881. He was able to give to the scientific world a complete list of the correspondence to LINNAEUS in the possession of the Society, as well as of those letters from LINNAEUS, which were then known."

Ulrich, Fr. FRANÇOIS POŠEPNÝ, 30-III-1836—27-III-1895. *Archeion* 18, 366-68, 1936 (received 1937). ISIS

White, M. D. Early observations on chromosomes and genes. *Annals of science* 2, 237, 1937. ISIS

D. — *Medical sciences*

Bartlett, Willard. AUGUSTUS CHARLES BERNAYS. *Surgery, gynecology and obstetrics* 64, 249-53, 1937. ISIS

Brunn, W.v. EDUARD VON RINDFLEISCH und ERNST VON BERGMANN zu ihrem 100. Geburtstage am 15 und 16 Dezember. *Münchene Medizinischen Wochenschrift* nr. 50, 2058, 1936. ISIS

Carbone, Domenico. Le esperienze inedite di TITO CARBONE (1863-1904). *Rivista di storia delle scienze mediche* 28, 85-98, 1937. ISIS

Cushing, Harvey. The life of Sir WILLIAM OSLER (1849-1919). 2 vols., ill., Oxford, Clarendon Press, 1925. ISIS

Reviewed in *Isis* 8, 358-61. Corrigenda and addenda, published by the author, New Haven, August 1936; copies obtainable by application to the author or the publishers. G. S.

De Jong, Russell N. GEORGE HUNTINGTON and his relationship to the earlier descriptions of chronic hereditary chores. *Annals of medical history* 9, 201-10, 2 fig., 1937. ISIS

Fischer, Martin. CHRISTIAN R. HOLMES : man and physician. 233 p., illus. Springfield, Ill., THOMAS, 1937. ISIS

Sumptuously printed volume recording the career of the man chiefly responsible for the splendidly designed and coordinated Cincinnati General Hospital, University of Cincinnati Medical School and related institutions. C. R. HOLMES (1857-1920) was born in Denmark and came to Cincinnati as a draughtsman in 1876. He received his M.D. degree from Miami in 1886 and entered general practice in the city. He quickly became a leader in the profession, and the rest of the story is chiefly concerned with the details of his ultimate triumph over corrupt political control of the city's hospitals and of his success in developing a great medical center.

C. D. L.

Flexner, Simon. A half century of American medicine. *Science* 85, 505-12, 1937. ISIS

Friedenwald, Harry. Notes on MORITZ SCHIFF (1823-1896). *Bulletin of the institute of the history of medicine* 5, 589-602, 1937. ISIS

Halley, Charles R. L. A surgeon of the old frontier — THOMAS G. MAGHEE (1842-1927). *Bulletin of the institute of the history of medicine* 5, 654-66, 4 fig,. 1937. ISIS

Kelly, E. C. (compiler). Medical classics, vol. 1, no. 1, 78 p., port., 7 pl. Baltimore, WILLIAM and WILKINS, 1936. ISIS

This new series aims to present the outstanding contributions of the masters of medicine and to accompany each group of such papers of a distinguished author with a *vita* in concise, schematic form, with the best obtainable portrait, a complete bibliography listing libraries in which each item is to be found, a brief historical sketch of the subject treated in the author's paper discussing the attitude toward this subject before and since the original publication, the paper in its entirety, and, if in a foreign language, a modern English translation. Ten numbers a year are planned at $ 10.00 per volume.

This first number contains three papers by Sir JAMES PAGET : On a form of chronic inflammation of bones (osteitis deformans) 1876; Additional cases of osteitis deformans, 1882 (PAGET's Disease); and On a disease of the mammary areola preceding cancer of the mammery gland, 1874 (PAGET's disease of the nipple).

C. A. K.

McFarland, Joseph. The beginning of bacteriology in Philadelphia. Recollections of what took place before the beginning of the present century, with contemporary portraits and a bibliography of the literature of that period. *Bulletin of the history of medicine* 5, 149-98, 1937. ISIS

Metchnikoff, Elis. Trois fondateurs de la médecine moderne. PASTEUR, LISTER, KOCH. Préface de E. T. BURNET. 196 p. Paris, ALCAN, 1933. ISIS

Olmsted, J. M. D. CLAUDE BERNARD's posthumously published attack on PASTEUR and PASTEUR's defense. *Annals of medical history* 9, 114-24, 1937. ISIS

Pitfield, Robert L. Sir MALCOLM WATSON, M. D., LL. D., a mile-year doctor. *Medical life* 44, 129-44, 1937. ISIS

Rosen, George. Social aspects of JACOB HENLE's medical thought. *Bulletin of the institute of the history of medicine* 5, 509-37, 1937. ISIS

Sa'di, Lutfi M. AL-HAKÎM CORNELIUS VAN ALEN VAN DYCK (1818-1895). *Isis* 27, 20-45, 1 pl., 12 fig., 1937. ISIS

With supplementary notes by C. V. A. VAN DYCK and GEORGE SARTON, and facsimiles of VAN DYCK's Arabic publications.

Schaefer, Romanus Johannes. Ein Beitrag zu den Ursachen der indischen Cholera im Rheinland 1893. *Proteus* 2, 144-51, 1937. ISIS

Schiff, Leonard J. A nineteenth century letter on the treatment of pneumonia. *Bulletin of the institute of the history of medicine* 5, 681-83, 1937. ISIS

Welch, William H. Adaptation in pathological processes. Reprinted from Transactions of the Congress of American physicians and surgeons, 1897, vol. IV, p. 284-310. With an introduction by SIMON FLEXNER. xi + 58 p., port. (Bibliotheca medica Americana, 3). Baltimore, Johns Hopkins Press, 1937 ($ 1.50). ISIS

E. — *Alia*

Cumont, Franz. Annuaire de l'Institut de philologie et d'histoire orientales et slaves, tome IV en 2 volumes. Mélanges FRANZ CUMONT. xxxvi + 1047 p., port. Bruxelles, Université libre, 1936. ISIS

Cet admirable *Festschrift* est analysé dans la 51e bibliographie d'*Isis*.

Lequier, Jules (1814-62). La liberté. Textes inédits présentés par JEAN GRENIER. 165 p. (Bibliothèque des textes philosophiques). Paris, VRIN, 1936. ISIS

Fragments posthumes complétant ceux déjà publiés : La recherche d'une prémière vérité, recueillis par CHARLES RENOUVIER, avec une notice biographique par L. DUGAS (Paris, COLIN 1924), reproduction de l'édition limitée de 1865.

XXth century

A. — *Mathematics*

Dixon, Alfred Cardew (1865-1936) by E. T. WHITTAKER. Obituary notices of the Royal Society of London 2, 165-74, 1936. ISIS

Hadamard, Jacques. L'Œuvre scientifique de PAUL PAINLEVÉ. *Revue de métaphysique et de mor.* 41, 289-325, 1934. ISIS

Hadamard, Jacques. Jubilé scientifique de. Allocutions prononcées à la cérémonie du 7 janvier 1936, adresses, télégrammes, liste des souscripteurs. 108 p. Paris, GAUTHIER-VILLARS, 1937. ISIS

Hardy, G. H. The Indian mathematician RAMANUJAN. *American mathematical monthly* 44, 137-55, 1937. ISIS

Popa, Ilie. 25 de ani de activitate a Seminarului Matematic din Iaşi. *Revista ştiintifică Adamachi* 21, 104-11, 1935. ISIS

Popa, Ilie. Matematica in ultimul pàtrar de veac la universitatea din Iaşi (La mathématique à l'université de Iaşi dans le dernier quart de siècle). *Natura* 25, 35-9, 1936. ISIS

Stuyvaert, Modeste (1866-1932). Obituary and bibliography by LUCIEN GODEAUX. *Annuaire de l'académie royale de Belgique* 103, port., 1937. ISIS

B. — *Physical sciences and technology*

Born, Max. Some philosophical aspects of modern physics. (Inaugural lecture as Tait professor of natural philosophy, University of Edinburgh). *Proceedings of the Royal society of Edinburgh* 57, 18 p., 1936-37. ISIS

Bowie, William. Geodetic operations in the United States, Jan. 1st, 1933 to Dec. 31st 1935. Special publication no. 207. Issued by Division of geodesy, U. S. Coast and geodetic survey, 25 p. Washington, Government Printing Office, 1936. ISIS

Reviewed by J. DE G. HUNTER, *Geographical journal* 89, 85, 1937.

Cox, Jacques. Notice sur la vie et les travaux de PAUL STROOBANT. *Rapport de l'Université libre de Bruxelles sur l'année académique* 1935-1936 ; Bruxelles, 1937, p. 100-07. ISIS

Leprince-Ringuet, Louis. Rayons cosmiques. Aspect des phénomènes et méthodes expériementales. Préf. de M. DE BROGLIE. 46 p., ill. Paris, HERMANN, 1934. ISIS

MacDonald, Hector Muno (1865-1935). By E. T. WHITTAKER. Obituary notices of the Royal society of London, no. 4, 551-58, 1935. ISIS

Rainov, T. I. SCHRÖDINGER and the theoretical foundations of quantum mechanics. *Sorena* no. 4, 9-27, 1936 (in Russian). ISIS

A discussion of SCHRÖDINGER's *Die gegenwärtige Situation in der Quantenmechanik* (*Naturwissenschaften* 23, Hefte 48-50, 1935).

Speter, Max. JULIUS RUSKA. Zu seinem 70. Geburtstag am 9. Februar 1937. *Österreichische Chemiker-Zeitung* Nr 4, 4 p., 1937. ISIS

Ullmo, Jean. Les idées d'EDDINGTON sur l'interaction électrique et le nombre 137. 26 p. Paris, HERMANN, 1934. ISIS

C. — *Natural sciences*

Ellsworth, Lincoln. The first crossing of Antarctica. *Geographical journal* 89, 193-213, 1937. ISIS

The crossing of 1935 November 23 to December 5. C. W. A.

Hardy, Sir William Bate (1864-1934). Collected scientific papers. Fellow of the Royal Society, Fellow of Gonville and Caius College, Cambridge. Published under the auspices of the Colloid Committee of the Faraday Society. xii + 922 p., port., 14 pl., figs. Cambridge, University Press, 1936. ISIS

Reviewed by C. A. KOFOID, *Isis* 27, 78-9, 1937.

Morosan, Nic. AL DONICI (1886-1936). *Revista ştiintificā Adamachi* 22, 119 24, 1936. ISIS

Seurat, L. G. Historique de la fondation de la Société d'histoire naturelle de l'Afrique du Nord (27 Mai 1909). *Bull. de la Société d'histoire naturelle de l'Afrique du Nord* 26bis, 10-17, 1935. ISIS

D. — *Medical sciences*

Bendheim, Otto L. On the history of HOFFMAN's sign. *Bulletin of the institute of the history of medicine* 5, 684-86, 1937. ISIS

Garrison, Fielding Hudson (1870-1935). FIELDING H. GARRISON Memorial number. *Bulletin of the institute of the history of medicine* 5, 299-403, port., facs., 1937. ISIS

Contents : Introduction : HENRY E. SIGERIST; GARRISON and the Army medical library, 1891-1930 : Lieutenant Colonel HUME; FIELDING H. GARRISON and his influence on American medicine : HENRY R. VIETS; The Colonel played the Piano : F. L. TIETSCH; GARRISON, the teacher : M. PIJOAN; FIELDING H. GARRISON : ARTURO CASTIGLIONI; The literary activity of FIELDING H. GARRISON, M. D. : CLAUDIUS FRANK MAYER.

Lint, Jan Gerard De, historien de la médecine (1867-1936). Obituary by J. J. G. TRICOT-ROYER. *Archeion* 19, 51-55, 1937. ISIS

E. — *Alia*

Hill, T. W. The Herbert Spencer Trust. *London Times Literary supplement*, February 6, 1937. ISIS

(Kahle, Paul). Studien zur Geschichte und Kultur des Nahen und Fernen Ostens. PAUL KAHLE zum 60. Geburtstag, überreicht von Freunden und Schülern aus dem Kreise des orientalischen Seminars der Universität Bonn. Herausgegeben von W. HEFFENING und W. KIRFEL. viii + 231 p., port. Leiden, BRILL, 1935. ISIS

(Littmann, Enno). Orientalistische Studien, ENNO LITTMANN, zu seinem 60. Geburtstag am 16. September 1935. Überreicht von Schulern aus seiner Bonner und Tübinger Zeit. Herausgegeben von R. PARET. vi + 156 p., port. Leiden, BRILL, 1935. ISIS

Malmeström, Elis. GOTTHARD VIRDESTAM. *Svenska Linné-Sällskapets Årsskrift* 20, 71-4, 1937 (in Swedish with English summary). ISIS

"The Rev. GOTTHARD VIRDESTAM, D. D., curate in the parish of Stenbrohult, LINNAEUS' birth-place, died at the age of 44 on the 16th of March this year. Although his life was short, his achievements were very extensive. Amongst other things he carried out the tremendous task of publishing the biographies of the clergy of the Dioecese of Växiö (to which Stenbrohult belongs) in a comprehensive work, which resulted in the conferment of the doctor's degree by the University of Lund, a very rare distinction for a person in his position. His interests and studies included also Linnaean matters. Soon after his appointment to Stenbrohult he founded a local association, named after the parish's greatest son, and became the editor of a yearbook, in which he published valuable papers on LINNAEUS' family and on the customs and manners in that part of the province during the great man's childhood."

(Sainéan, Lazare, 1859-1934). Lettres de L. SAINÉAN le grand philologue. Publiées, préfacées et annotées par son frère CONSTANTIN. 75 p., port., facs. Paris, GEUTHNER (5 fr.). ISIS

Biographie et lettres du savant ROUMAIN, auteur de plusieurs études sur l'argot, la langue de RABELAIS, les sources de l'étymologie française et romane. G. S.

Stern, Alfred. Le cercle de Vienne et la doctrine néopositiviste. *Thalès* 2, 211-27, 1935 (Paris 1936). ISIS

PART II

HISTORICAL CLASSIFICATION

I. ANTIQUITY

1. — ANTIQUITY (*generalities*)

Bayet, Jean. Présages figuratifs déterminants dans l'antiquité gréco-latine. *Mélanges Franz Cumont*, p. 27-51, 1936. ISIS

Evans, Joan. Index to the palace of Minos. With special sections classified in detail and chronologically arranged by Sir ARTHUR EVANS. London, MACMILLAN, 1937. ISIS

That is the publication which was announced in *Isis* 24, 375. G. S.

Forbes, R. J. Iets over antieken mijnbouw. *Vooraziatisch-Egyptisch Gezelschap Ex Oriente Lux*, no. 4, 255-60, 1 table, 1936. ISIS

Comparative study of ancient mining from the old Stone Age down to Roman days, with a very remarkable synoptic table. G. S.

Neugebauer, O. Untersuchungen zur antiken Astronomie, I. *Quellen und Studien zur Geschichte der Math., Astron., u. Phy.*, Abtg. B : Studien, 4, 29-33 ; II. Datierung und Rekonstruktion von Texten des Systems II der Mondtheorie, 34-91, 1937. ISIS

Pique, Rene. Le vin et la médecine dans l'antiquité. C. R. du IVe Congrès de chimie industrielle, 552-60, 1925. ISIS

Le vin et la médecine chez les Egyptiens, les Hébreux, les Grecs et les Romains. Importante bibliographie. L. L.

Reymond, A. Sciences occultes et rationnelles. Etude comparative de leurs principes et méthodes dans l'antiquité greco-romaine. *Atheneum* 2, 331-50, 1936. ISIS

2. — EGYPT

Berger, Suzanne. A note on some scenes of landmeasurement. *Journal of Egyptian archaeology* 20, 54-6, 1 pl., 1934. ISIS

Boyd, Lyle G. ; Boyd, William C. Les groupes sanguins chez les anciens égyptiens. *Chronique d'Egypte* 12, 41-4, 1937. ISIS

Capart, Jean. Clepsydres égyptiennes. *Chronique d'Egypte* 12, 45-49, 3 fig., 1937. ISIS

Apropos of A. POGO's memoir (*Isis* 25, 403-25, 1936). G. S.

Dawson, Warren R. Studies in the Egyptian medical texts. — III. *Journal of Egyptian archaeology* 20, 41-6 ; IV. 185-88, 1934 ; V. 21, 37-40, 1935. ISIS

Goossens, Roger. Un conte égyptien : PHARAON, roi des phoques. *Mélanges Franz Cumont*, p. 715-22, 1936. ISIS

"On peut peut-être aller plus loin. S'il y a du folklore égyptien dans l'*Odyssée*, n'y en a-t-il pas aussi dans l'*Exode* ? Le trait le plus curieux de 'passage de la Mer Rouge' (MOÏSE étendit sa main sur la mer... les eaux formaient comme une muraille...) paraît deux fois dans les *Contes populaires* qu'à traduits MASPERO. Il y a là, sans doute, un conte égyptien du 'sorcier qui ouvre et ferme la mer'. De sorte que le lien que nous trouvons établi dans la légende moderne entre l'*Exode* et l'histoire du PHARAON, roi des phoques, n'est peut-être pas, après tout, si artificiel ni si récent. Le miracle

de Moïse est peut-être emprunté au même conte pharaonique que l'épisode de Prôteus."

Griffith, Francis Llewellyn (1862-1934) ; **Crowfoot, G. M.** On the early use of cotton in the Nile Valley. *Journal of Egyptian archaeology* 20, 5-12, 2 fig., 1934. ISIS

Hulme, E. Wyndham. Early iron-smelting in Egypt. *Antiquity* 11, 222, 1937. ISIS

Morant, Henry de. Le chat dans l'art égyptien. *Chronique d'Egypte* 12, 29-40, 5 fig., 1937. ISIS

Piankoff, Alexander. The sky-goddess Nut and the night journey of the Sun. *Journal of Egyptian archaeology* 20, 57-61, 1934. ISIS

Wainwright, G. A. Some celestial associations of Min. *Journal of Egyptian archaeology* 21, 152-70, 10 fig., 1935. ISIS

Wainwright, G. A. The pyramids of Meroë in a Japanese colour-print. *Antiquity* 11, 229-33, 2 pl., 4 fig., 1937. ISIS

Wilbour, Charles Edwin. Travels in Egypt. (December 1880, May 1891). Letters of Ch. E. Wilbour, edited by Jean Capart. xv + 614 p., fig., pl. Brooklyn, N. Y., Brooklyn Museum 1936. ISIS

Reviewed by Günther Roeder, *OLZ* 40, 418, 1937 and in *Chronique d'Egypte* 12, 71-72, 1937.

Wood, R. W. The purple gold of Tut'ankhamûn. *Journal of Egyptian archaeology* 20, 62-5, 1 pl., 1934. ISIS

3. — BABYLONIA AND ASSYRIA

Amschler, Wolfgang. Goats from Ur and Kish. *Antiquity* 11, 226-28, 2 pl., 6 fig., 1937. ISIS

Cross, Dorothy. Movable property in the Nuzi documents. xii+65 p. (*American oriental series*, 10). New Haven, Conn., American Oriental Society, 1937. ISIS

"The present monograph is the outgrowth of a more comprehensive

study of economic conditions in the second millennium B.C. on the basis of the documents from Nuzi. For reasons arising from the peculiar legal background of the Nuzi society, as set forth in the Introduction, an adequate evaluation of the records dealing with immovable property would have required the cooperation of a specialized jurist. I have concentrated, therefore, on transactions involving movable property alone." Contents : 1. Metrology, Synchretistic character of Nuzi metrology; A. Weights, B. Measures of length, C. Measures of area, D. Measures of capacity. 2. Movable property, A. Domestic animals, B. Produce, C. Metals, D. Wool and garments, E. Implements, F. Miscellanea, Table of principal relative values, Index of selected lexical items.

Dittrich, Arnošt. La table de la nouvelle lumière de la lune de KIDINNU. Colonnes A, B, F. Zvláštní otisk ze Spisů Přírodovědecké fakulty č. 137. Publications de la Faculté des sciences de l'Université Charles, Číslo 137, Rok 1935 (received March 1937), (in Czech, with French summary). ISIS

Genouillac, H. de. Fouilles de Telloh. Tome II : Epoques d'Ur III[e] dynastie et de Larsa. Avec un appendice sur les fouilles de médaïn, par R. GHIRSHMAN. 170 p., 59 pl. (Mission archéologique du Musée du Louvre et du ministère de l'instruction publique). Paris, GEUTHNER, 1936 (Prix des tomes I et II, 400 frs.). ISIS

Le volume I de cette œuvre monumentale, consacré aux époques présargoniques, a paru en 1934 (*Isis* 24, 240). L'auteur nous dit dans la préface : "je n'ai pas voulu, encore moins que pour la période archaïque, donner de simples inventaires, comme je l'avais fait dans mes *Premières recherches archéologiques à Kich* ; j'ai essayé, au contraire, de situer les documents dans leur cadre vivant, dans le milieu social des idées et des coutumes, en me servant des textes; j'ai aussi voulu employer largement la méthode comparative, en tenant compte des remarquables travaux des archéologues qui ont travaillé à Ur, Uruk, Khafadja, Kish, etc. La logique du plan m'a fait commencer cette étude par un chapitre sur la topographie, un peu austère, et par un relevé des éléments d'architecture qui n'intéressera pas également tous les lecteurs : je m'en excuse, mais il était impossible de rejeter cette partie de ma tâche. C'est à la mémoire de LEON HEUZEY et EDMOND POTTIER, deux maîtres disparus de l'archéologie orientale, que je dédie mon travail." 1. Topographie de Lagash; 2. L'architecture religieuse et civile; 3. Les coutumes funéraires; 4. La sculpture; 5. Les figurines; 6. Petits modèles; 7. Cylindres et sceaux; 8. Amulettes et ornements; 9. Cuivre et métaux; 10. Poterie céramique; 11. Poterie de pierre; 12. Objets en pierre et poids; 13. Divers; 14. Inscriptions et empreintes.

Lippmann, Edmund O. von. Technologisches aus dem Sumerisch-babylonischen "Gilgamesch-Epos", dem ältesten der Welt-Litteratur. *Archeion* 18, 301-07, 1936 (received 1937). ISIS

Neugebauer, O. Mathematische Keilschrift-Texte, III. Teil. 83 p., 6 pl. (*Quellen und Studien zur Geschichte der Mathematik, Astronomie und Physik* Abt. A, 3. Bd.) Berlin, SPRINGER, 1937. ISIS

Reviewed by F. THUREAU-DANGIN, *Revue d'assyriologie* 34, 287-92, 1937.

Pfeiffer, Robert H.; Speiser, E. A. One hundred new selected Nuzi texts. Transliterated by ROBERT H. PFEIFFER. With translations and commentary by E. A. SPEISER. *Annual of the American schools of oriental research* 16, 168 p., 1935-36. ISIS

"The excavations at Nuzi, which were begun by the late Dr. EDWARD CHIERA in 1925, were first sponsored jointly by the Iraq Museum and the American School of Oriental Research in Baghdad. The texts recovered under the auspices of these two institutions are available virtually in full in CHIERA's *Joint Expedition at Nuzi*, vols. I-V. Beginning with the year 1927 Harvard University replaced the Iraq Museum as joint sponsor of the Nuzi excavations. All the tablets subsequently discovered are now in the Harvard Semitic Museum, where they have been catalogued and given consecutive SMN numbers. The Harvard Semitic Series has presented thus far three volumes of this material prepared by CHIERA, PFEIFFER, and MEEK respectively. They offer barely one sixth of the total. The importance of the Nuzi documents need no longer be stressed to any Assyriologist. The responsibility for the publication of the remainder of the material is correspondingly great. But few scientific institutions could undertake in these days the financial burden of publishing some twenty volumes of cuneiform texts. The result is a compromise of the type exemplified in the present volume. Instead of continuing with expensive autographed copies, the Harvard Semitic Museum and the Baghdad School are commencing herewith the publication of the Nuzi texts in transliteration, with appended translations and commentaries."

Scheil, V. La charrue symbole de Ningirsu. *Revue d'assyriologie* 34, 42, 1937. ISIS

Schiffer, S. Les origines de l'astronomie : L'astronomie et l'astrologie babyloniennes. *Thales* 2, 142-51, 1935. (Paris, 1936). ISIS

Thierens, A. E. Astrology in Mesopotamian culture. An essay. 59 p., 2 fig. Leiden, BRILL, 1935. ISIS

Contents : 1. Introduction; 2. Orientation; 3. Monotheism?; 4. The cosmical triad; 5. The Madonna-world-creation; 6. The heavenly or cyclical triad — the seven planets; 7. Shamash; 8. Sin; 9. Ishtar; 10. The quaternary; 11. Anu-ea-enlil as Uranus-Neptune-Pluto; 12. The zodiac.

Thompson, R. Campbell. A dictionary of Assyrian chemistry and geology. xlviii + 266 p. Oxford, Clarendon Press, 1936. ISIS

Reviewed by GEORGE SARTON, *Isis* 26, 477-80, 1937.

Thompson, R. Campbell. Assyrian prescriptions for diseases of the feet. *Journal of the Royal Asiatic Society* 265-86, 1937. ISIS

"The following are translations from the cuneiform texts of the seventh century B. C. (from ASHURBANIPAL's library at Nineveh) which deal with diseases of the feet and legs. The tablets are published in my Assyrian medical texts, and the translations are given here with various duplicates from elsewhere. Some have already been put before scholars by EBELING (*Archiv f. Gesch. d. Medizin*, xiii, xiv, and *Keilschriftexte Medicinischen Inhalts*), but since his publication of them several 'joins' have been made, so that, with the text hitherto untranslated and with the new knowledge subsequently acquired, a fresh edition will not be out of place."

Thureau-Dangin, F. La mesure du "qa". *Revue d'assyriologie* 34, 80-6, 1937. ISIS

Thureau-Dangin, François. Observations sur l'algèbre babylonienne, *Archeion* 19, 1-12, 1937. ISIS

"Je crois en avoir assez dit pour montrer que BORTOLOTTI n'a pas, semble-t-il, prouvé 'che tutti i problemi (quadratici babilonesi) fino ad ora studiati si presentano come già ridotti alla ricerca di due numeri dei quali si supponga dato il prodotto e la somma, ovvero il prodotto e la differenza' et on ne s'étonnera pas que je ne puisse souscrire à sa conclusion, qui est, 'che nei testi babilonesi non si trovano equazioni algebriche, nè traccia di metodo algebrico razionalmente costituito'."

Thureau-Dangin, Francois. Notes sur la mathématique babylonienne. *Revue d'assyriologie* 34, 9-28, 1937. ISIS

Contents : 1. BM 85200 — Vat 6599, XXVI, XXVII, XXIX et XXX; 2. L'équation du deuxième degré et la règle de fausse position; 3. BM 85194, no. XXVII; 4. L'équation du troisième degré; 5. La résolution de l'équation du deuxième degré.

Vogel, Kurt. Wann beginnt die Algebra? *Semester-Berichte zur Pflege des Zusammenhangs von Universität und Schule* 9. Semester, 107-23, Winter 1936-37. ISIS

"... Auf jeden Fall gehört die geschilderte babylonische 'Algebra' zu dem mathematischen Rüstzeug, das den Griechen zur Verfügung stand, als sie in die Wissenschaftsgeschichte eintraten. Ohne solche Vorarbeiten wäre auch wohl die unheimlich rasche Entwicklung der griechischen mathematischen Wissenschaft in einem knapp drei Jahrhunderte umfassenden Zeitraum nicht zu verstehen. Auch die bisher einzigartige Stellung DIOPHANTS als 'Vater der Algebra' erscheint jetzt nach dem Bekanntwerden der babylonischen Quellen in einem klareren Licht."

4. — GREECE

Dehn, M. Beziehungen zwischen der Philosophie und der Grundlegung der Mathematik im Altertum. *Quellen und Studien zur Gesch. d. Math., Astron. und Phy.* Abtg. B : Studien, 4, 1-28, 1937. ISIS

Edelstein, Ludwig. Greek medicine in its relation to religion and magic. *Bulletin of the Institute of the history of medicine* 5, 201-46, 1937. ISIS

Honigmann, Ernst. Die Anaphorai der alten Astrologen. Ein Versuch, die Anaphorai und Klimata des Michigan-Papyros 149 zu erklären. *Michigan papyri*, 3, 301-21, 1936. ISIS

Extract from the Michigan Papyri, vol. III, edited by JOHN GARRETT WINTER, Ann Arbor, 1936; reviewed by W. HARTNER, *Isis* 27, 337-39, 1937. G. S.

Mondolfo, Rodolfo. L'infinito nel pensiero dei greci. 440 p. LEMONNIER, Firenze, 1934. ISIS

"Da queste ricerche su l'infinito nel pensiero dei Greci, che intendono portare nella discussione dell'interessante problema storico un approfondimento sistematico e una larghezza di documentazione maggiori dell' usato, credo possa risultare definitivamente sfatata la leggenda di una refrattarietà del genio ellenico alla comprensione dell'infinito, e messa in luce l'importanza del contributo recato dai Greci allo sviluppo delle dottrine scientifiche, filosofiche e religiose dell'infinità."

Santillana, Georges de. La crise du rationalisme grec. *Thales* 2, 183-210, 1935 (Paris, 1936). ISIS

Taylor, F. Sherwood. The origins of Greek alchemy. *Ambix* 1, 30-47, 2 fig., 1937. ISIS

Taylor, F. Sherwood. Symbols in Greek alchemical writings. *Ambix* 1, 64-7, 2 fig., 1937. ISIS

Thompson, D'Arcy Wentworth. A glossary of Greek birds. New edition. viii + 342 p. (St. Andrews University publications, no. 39). Oxford University Press, 1936. ISIS

Reviewed by DEMETRIUS CACLAMANOS, *Nature* 139, 305-06, 1937.

Ver Eecke, Paul. Note sur une démonstration antique d'un théorème de lieu géométrique. *Mathésis* 11-14, 1937. ISIS

Vogel, Kurt. Beiträge zur griechischen Logistik. Erster Teil. *Sitzungsberichte der Bayerischen Akademie der Wissenschaften*, Mathematisch-naturwissenschaftliche Abteilung). p. 357-472. München 1936. ISIS

Inhalt : Vorwort; Einleitung; Das Zählen (Zählen- und Ziffernsystem Fingerrechnen, Abakus); Die Addition; Die Subtraktion; Die Multiplikation; Die Division; Die Bruchrechnung (allgemeine Übersicht); Der Stammbruch; Der allgemeine Bruch; Erweitern und Kürzen; Addition und Subtraktion der Brüche; Multiplikation der Brüche; Division der Brüche; Die Logoi; Die Logoi als Brüche, der Bruch als Arithmos.

Wilhelm, Gundel. Neue astrologische Texte des HERMES TRISMEGISTOS (*Abhandlungen der Bayerischen Akademie der Wissenschaften*, Phil. Hist. Abt. H. 12). viii + 378 p. Munich, 1936. ISIS

Reviewed by CLAIRE PRÉAUX, *Chronique d'Egypte* 12, 112-15, 1937.

5. — ROME

Ashby, Thomas. The aqueducts of ancient Rome. Edited by I. A. RICHMOND. xiv + 342 p. Oxford, Clarendon Press, 1935. ISIS

Reviewed by C. N. B., *Geographical journal* 88, 552-53, 1936. Chapters on the making and preservation of the aqueducts in Roman times, the staff of the Imperial Water Board, the career and work of FRONTINUS, and the engineering of the aqueducts; followed by all that can be learnt about the remains of the eleven main aqueducts, taken in chronological order from Appia 312 B. C. to Alexandriana 222-235 A. D. See review of the companion volume by the late ESTHER B. VAN DEMAN in *Isis* 23, 470. C. W. A.

Harden, D. B. Snake-thread glasses found in the East. *Journal of Roman studies* 24, 50-55, 2 pl., 1934. ISIS

"Perhaps the most remarkable product of Rhenish glass-furnaces during the Imperial period is the well-known fabric bearing polychrome or monochrome applied decoration. These are the glasses termed by German archaeologists 'Schlangenfaden' or 'snake-thread' glass. They are of various shapes and were produced in great numbers from the last quarter of the second to the fourth century A.D., probably largely, if not entirely, at Cologne. Similar glasses from the eastern Roman provinces are of very rare occurrence."

Harden, D. B. Romano-Syrian glasses with mould-blown inscriptions. *Journal of Roman studies* 25, 163-86, pl. 23-8, 1935. ISIS

Hyde, Walter Woodburn. Roman Alpine routes. *Memoirs of the American philosophical society* 2, xvi + 248 p., map. Philadelphia, 1935. ISIS

Contents : Introduction; Selected bibliography; 1. The Alps in Roman times and after; 2. Roman passes in the western Alps; 3. Roman passes in the central Alps; 4. Roman passes in the Eastern Alps; The Brenner system; 5. Roman passes in the eastern Alps; East of the Brenner; Conclusion; Excursus : HANNIBAL's Pass.

Macdonald, George. The dating-value of Samian ware. A rejoinder. *Journal of Roman studies* 25, 187-200, 1935. ISIS

II. MIDDLE AGES

6. — MIDDLE AGES (*generalities*)

Beccaria, Augusto. Il ritorno della scienza classica nel primo medioevo. *Rivista storica italiana* 2, 36 p., 1937. ISIS

Charland, T. M. Artes predicandi. Contribution à l'histoire de la rhétorique au moyen âge. 300 p. Paris, VRIN, 1937. ISIS

Chenu, M. D. Notes de lexicographie médiévale : Disciplina. *R. des sc. philosophiques et théologiques* 25, 686-92, 1936. ISIS

Englhardt, Georg. Die Entwicklung der dogmatischen Glaubenspsychologie in der Mittelalterlichen Scholastik vom ABAELARDstreit (um 1140) bis zu PHILIPP DEM KANZLER (gest. 1236). *Beiträge zur Geschichte der Philosophie und Theologie des Mittelalters* 30, H. 4-6, xvi + 503 p., 1933. ISIS

Figueiredo, Fidelindo de. Para a história da crítica literária em Portugal : a reconstituição da literatura medieva (subsídio bibliográfico). Comunicação feita en Coimbra (SALA MARNOCO e SOUSA). em 4 de Outubro. III congrès international d'histoire des sciences, Actes, conférences et communications, 98-100, Lisbon 1936. ISIS

Gundel, W. Religiongeschichtliche Lesefrüchte aus Lateinischen Astrologenhandschriften. *Mélanges Franz Cumont*, p. 225-52, 1936. ISIS

Contents : 1. Texte der Laienastrologie; 2. Die Bilder der Planeten

Tierkreisgötter und anderer Sterngottheiten in astromagischen und iatromathematischen Texten.

Lucas, Henry S. Mediaeval economic relations between Flanders and Greenland. *Speculum* 12, 167-81, 1937. ISIS

McColley, Grant ; Miller, H. W. Saint BONAVENTURE, FRANCIS MAYRON, WILLIAM VORILONG, and the doctrine of a plurality of worlds. *Speculum*, 12, 386-89, 1937. ISIS

"It appears that VORILONG regarded the existence of more than one world as a definite probability, and was sufficiently impressed by this probability to so re-interpret fundamental Christian beliefs that they were not in conflict with the idea of more than one inhabited globe. His place is apparently that of an important intermediary between the writers of the thirteenth and fourteenth centuries who declared that God could create a plurality of worlds, and those of the sixteenth and later eras who asserted that God had created such a plurality. The final phase of the conception is the most striking and perhaps the most vital, but it is in the last analysis a development from what had gone before, and preceding JOHN MAJOR and GIORDANO BRUNO were such men as NICOLAS OF CUSA and WILLIAM VORILONG. The predecessors of these intermediaries were in turn Saint BONAVENTURE, FRANCIS MAYRON, and the many sympathetic philosophers and theologians of the thirteenth and fourteenth centuries discussed by PIERRE DUHEM. Each of these three precursors of the sixteenth century, St-BONAVENTURE, FRANCIS MAYRON, and WILLIAM VORILONG, should have some place in the history of the development of the mediaeval and renaissance doctrine of a plurality of worlds."

Reichborn-Kjennerud, I. The school of Salerno and surgery in the north during the Saga age. Translated by ANNA TJOMSLAND. *Annals of medical history* 9, 321-37, 1937. ISIS

"A more thorough investigation of the surgical methods practiced at Salerno, compared with reports of the treatment of wounds and isolated cases of operations found in the writings of the North, have convinced me that in Saga times (1150-1350) there has surely been a direct influence on the surgery of the North by that of Italy, even before the books of HENRIK HARPESTRENG appeared."

Sabine, Ernest L. City cleaning in mediaeval London. *Speculum* 12, 19-43, 1937. ISIS

Thomson, S. Harrison. Progress of mediaeval studies in the United States and Canada. *Bulletin* 13. 86 p. Boulder, Colorado, Mediaeval Academy of America, 1937. ISIS

Thorndike, Lynn. The secrets of Hermes (An alchemical text re-

produced from MSS Bern Stadtbibliothek B. 44, fols. 231^{r}-233^{v} or 232^{r}-234^{v}, and Vatican Palatine Latin 1335, fols. 96^{r}-99^{r}). *Isis* 27, 53-62, 1937. ISIS

"In 1930 in a brief note in *Isis* entitled, 'Seven Salts of Hermes', I reproduced a short passage enumerating seven salts corresponding to the planets from an English manuscript (Oxford, All Souls College 81, 15th century, fol. 19^{r}) of the alchemical work which seems to have commonly been called *The Secrets of Hermes*. I now propose to give the text more fully from two continental manuscripts, so far as the seven planets, metals and salts are concerned. Whether this passage is a complete text in itself or merely the introduction to *The Secrets of Hermes* seems uncertain."

Thorndike, Lynn. Two more alchemical manuscripts. *Speculum* 12, 370-74, 1937. ISIS

"The two alchemical manuscripts to be considered in this article add two further treatises, both apparently hitherto unknown, to the Lullian alchemical collection, of which one certainly and the other probably dates before 1500. The manuscripts also contain other matter of importance for the history of alchemy during the later middle ages and around the year 1500. One manuscript is now found in the Stadtbibliothek of Bern : the other is preserved in the Riccardian library at Florence."

Titley, A. F. The macrocosm and the microcosm in medieval alchemy. *Ambix* 1, 67-9, 4 pl., 1937. ISIS

Van de Vyver, Andre. L'évolution scientifique du haut moyen âge. *Archeion* 19, 12-20, 1937. ISIS

7. — BYZANTIUM

Delatte, Armand et Louis. Un traité byzantin de géomancie (codex Parisinus 2419). *Mélanges Franz Cumont*, p. 575-658, 1936. ISIS

"Le texte que nous éditons comprend les parties suivantes. 1. Exposé de la valeur absolue des figures géomantiques; 2. Remarques diverses sur la signification de certaines mansions et sur le rapport des figures avec les planètes; 3. Extrait du traité de géomancie de NICOLAS D'OTRANTE (XIII^{e} siècle)." "On notera des concordances entre le traité de NICOLAS et l'*Ars Geomantiae* de HUGO SANCTELLIENSIS; 4. Note incomplète sur les rapports des figures avec les éléments et les signes du Zodiaque; 5. Long chapitre consacré à l'étude de la valeur absolue et de la valeur relative (d'après la position dans les différentes mansions) des figures; 6. Noms 'persans' des figures, accompagnés de nouvelles indications sur la signification de ces dernières; 7. Remarques sur la façon de former les figures et sur la signification des figures *témoins*; 8. Solutions de quelques questions; 9. Deux chapitres

sur les significations des figures; 10. Solution de diverses questions; 11. Nouvel exposé de la signification des figures et des mansions; 12. Solution de quelques questions. Une partie du texte des nos. 10 et 11 est tirée d'un ouvrage latin très apparenté, sinon identique, à l'*Ars Geomantiae* de HUGO SANCTELLIENSIS."

Lámpros, Spyrídôn P. Table of the Byzantine emperors. 28 p., 97 pl. quarto. Publishing House of Hellenic Independence in Athens 1930 (in Greek). ISIS

Admirable collection of iconographic documents (some of them printed in colors) concerning the Byzantine emperors. G. S.

III. ORIENTAL SCIENCE AND CIVILIZATION

8. — WESTERN ASIA

(including "the ancient East" in general)

Duchesne-Guillemin, Marcelle. La harpe en Asie occidentale ancienne. *Revue d'assyriologie* 34, 29-41, 1937. ISIS

"La genèse des différents types de harpe et leur expansion illustrent à souhait la richesse et la force de la civilisation sumérienne. C'est Sumer qui connaît les premières harpes arquées et qui fournit à l'Égypte sa harpe verticale; l'horizontale survit aux Indes. C'est en Babylonie que la harpe arquée du type horizontal se transforme en harpe angulaire. C'est là que cette dernière, redressée et maniée sans plectre, donne naissance au type angulaire vertical. Les deux types nouveaux gagnent l'Assyrie, puis l'Iran. Et l'un d'eux se répand plus loin, portant pour ainsi dire aux limites du monde un trait de l'héritage sumérien."

Moorad, Philip J. A comparative study of medicine among the ancient races of the East : Egypt, Babylonia, and Assyria. *Annals of medical history* 9, 155-67, 1937. ISIS

Seguin, M. A. Etude sur le pétrole dans l'Asie occidentale ancienne. L'Elam et la Mésopotamie. II[e] congrès mondial du pétrole, Paris, Juin 1937, 11 p. ISIS

Wainwright, G. A. The occurrence of tin and copper near Byblos. *Journal of Egyptian archaeology* 20, 29-32, 1 fig., 1934. ISIS

"No single one of the above points, nor even their sum total, is *proof* that the ancient Egyptians got their tin from Byblos. On the other hand, there is here a great deal of presumptive evidence in favour of such a supposition. The conditions postulated as probably necessary for a primitive tin industry, and for the discovery of the art of bronze manufacturing, are

both to be found at Byblos. The city also has a further claim to our notice in having been a famous trading centre from the dawn of civilization. Moreover, it was in the closest touch with Egypt. Byblos, or the Kesrwan district, thus stands apart from all those other possible sources which LUCAS has collected. Farther away to the north tin deposits are said to exist near Sinous and Aleppo, but this statement is as yet unconfirmed. If they should prove suitable, the Egyptians would no doubt be likely at some time or another to have made use of them also."

CENTRAL ASIA

Edgar, J. H. Tibetan numbers. *Journal of the West China border research society* 8, 170, 1936. ISIS

Obermiller, E. A. Puti Izucheniya Tibetskoĭ Meditsinskoĭ Literatury (Ways of studying Tibetan medical literature). Bibliografiya vostoka no. 8-9, 48-60, 1935 (in Russian). ISIS

The plan for research in the medicine of the Orient as elaborated by the All-Soviet Institute of Experimental Medicine includes study of the medicine of Tibet and Mongolia both for practical purposes and as an element in the history of medical thought. Through the expeditions of the Institute into Buriat-Mongol ASSR the amount of ancient Tibetan medical literature available has been greatly increased. Much of it has been published in the Aginski Datsan (in Eastern Buriatia).

All European study of Tibetan medicine, by CSOMA DE KÖRÖS, BADMAEFF, POZDNEEFF, LAUFER, etc., has been based upon the study of one text, the *Rgyud-bṣi* ("Four tractates", see SARTON's *Introduction* 1, 538) to the complete neglect of the other colossal Indian and Tibetan materials which are closely connected with it. We have to do, however, not with a single isolated text, but with a whole scientific system, Indo-tibetan. For Thibetan medicine is Indian and Buddhist. Indeed, the *Rgyud-bṣi* itself is a translation of the *Aṣhṭâṅga-hridaya-saṃhitā* of VÂGBHATA (*Introduction* 1, 480). Our first task should be the confrontation of such texts with their translations in order to compile a dictionnary of Tibetan medical terms. Then, with the terms explicitly defined, we should turn our attention to the careful study of the vast array of commentaries and supplementary literature.

The author mentions much of this literature by name. He promises to pursue his researches along the lines indicated. Unfortunately he died before his promises could be carried out. MORTIMER GRAVES.

Ünver, A. Süheyl. Les bases de la médecine chez les Turcs Ouigurs. *Türk tib tarihi arkivi* (Archives d'histoire de la médecine turque) 2, 27-8, 1937. ISIS

EASTERN ASIA

(Including works relative to the whole of Buddhist Asia, or to India, Central and Eastern Asia combined).

Chikashige, Masumi. Alchemy and other chemical achievements of the ancient Orient. The civilization of Japan and China in early times as seen from the chemical point of view. 102 p., 17 pl. Tokyo, UCHIDA, 1936. ISIS

Reviewed by TENNEY L. DAVIS, *Isis* 27, 79-81, 1937.

Colani, M. Trousses de toilette hallstattienne et actuelle. *Bulletin de l'Ecole française d'extrême orient* 33, 988-92, 2 fig., 1934. ISIS

Comparaison d'instruments pour le curage des oreilles : hallstattiens et annamites. G. S.

Cordier, Georges. Etude sur la littérature annamite. Première partie, Considérations générales. 290 p. Saigon, Editions d'Extrême-Asie, 1933. ISIS

Reviewed by NGUYEN-VAN-TÔ, *Bulletin de l'École d'extrême orient* 33, 999, 1934.

Gardner, G. B. Ancient beads from the Johore river as evidence of an early link by sea between Malaya and the Roman Empire. *Journal of the royal Asiatic society* 467-70, 3 pl., 1937. ISIS

Gaspardone, Emile. Bibliographie annamite. *Bulletin de l'Ecole française d'extrême-orient* 34, 1-173, 1935. ISIS

Bibliographie faite avec beaucoup de soin mais contenant peu de choses intéressant nos lecteurs. Elle est divisée comme suit : Introduction. I. Vie de Lê QUI-DÔN; ses œuvres, PHAN HUY-CHÚ; Abréviations et conventions. Bibliographie, I. Gouvernement, II. Histoire, III. Littérature, IV. Légendes, confucéisme, bouddhisme, traités divers. Index. Je note seulement le no. 149, un traité de géomancie à la manière chinoise par TRÂN QUOC-KIÊT (début du XV^e siècle); les nos. 150 à 152 sont aussi des traités de géomancie, le no. 153 est une pharmacopée "Médecines du sud à l'efficacité divine" par le maître TUÊ-TINH. Etant donnés d'une part l'érudition de l'auteur et d'autre part le très petit nombre des publications annamites il est étrange qu'il ne connaisse pas le livre du Dr. ALBERT SALLET : *L'officine sino-annamite en Annam* (Paris 1931; *Isis* 22, 267-72). Le dernier numéro (154) se rapporte à une "Méthode très complète de calcul" par VU QUYNH mais l'auteur ne nous dit rien sur le contenu de ce travail. G. S.

Weck, Wolfgang. Heilkunde und Volkstum auf Bali. xii + 248 p., 27 fig., Stuttgart, ENKE, 1937. ISIS

This is a fundamental study, based on the author's experiences as a government physician in the Dutch East Indies and on his elaborate studies of all the native documents. His list of Bali writings (lontars) includes 256 items. Says the author : "Meine Untersuchungen beschränkten sich zunächst auf einheimische Behandlungsmethoden und Medikamente, dann ging ich wegen der unbefriedigenden Auskünfte, die mündlich zu erhalten waren, zu dem Studium der Usadas über, in denen Krankheitsnamen mit den dazu gehörenden Heilmitteln oder auch Krankheitsbilder aufgezählt werden. Ich erkannte aber bald, dass man sich damit nur an der Oberfläche des ärztlichen Wissens der Balier bewegt und dass vieles unverständlich bleiben muss, solange man nicht auch den Tuturs, den theoretischen Lehren seine Aufmerksamkeit schenkt. Auf sie wird in den Usadas stets verwiesen als den Trägern der Fundamente aller medizinischen Weisheit. Die aus ihrem Inhalte sich ergebenden Zusammenhänge mit einer Menge völkerkundlicher Probleme, die Feststellung, dass der balische Arzt sich mit seiner Wissenschaft weit über die Praktiken des primitiven Medizinmannes erhebt, das bunte Bild der aus fremden Einflüssen und selbständig aufgebauten Systemen zusammengewachsenen balischen Heilkunde führten mich zu der Erkenntnis, dass ihren allgemeinen Grundlagen ein höherer Wert als der darin begründeten Praxis zukommt, weswegen ich mich zu einer Abhandlung entschlossen habe, die sich mehr an die Allgemeinheit als nur an einen ärztlichen Leserkreis wendet."

The subject is divided as follows : Literaturverzeichnis, Einleitung, Die balischen Ärzte, Die medizin-philosophischen Lehren der Balier, Anatomie, Physiologie, Ehe und Schwangerschaft, Die Krankheiten, Cholera, Lepra, Pemali, Pocken, Kropf, Ärztliche Diagnostik, Desti (Krankheitszauber), Heilmittel, Yoga, Der menschliche Körper als Mikrokosmos. Sasirep atangi, Die Gifte. The lack of an index is unpardonable. G. S.

9. — INDIA

Brohier, R. L. Ancient irrigation works in Ceylon. Parts I, II, III. 37 ; iv + 43 ; viii + 77 p. Colombo, Ceylon Government Press, 1934-35. ISIS

Reviewed by P. E. PIERIS, *Geographical journal* 89, 71-2, 1937. " A laborious collection of miscellaneous traditions and facts, with a series of useful maps. " C. W. A.

Hilgenberg, Luise. Die Anschauungen von den Konstitutionstypen in der Medizin Altindiens und unserer Zeit. *Paul Kahle Festschrift*, p. 156-62, Leiden, BRILL, 1935. ISIS

Huebotter, Franz. Die Sutra über Empfängnis und Embryologie.

Übersetzt und eingeleitet. *Mitteilungen der Deutschen Gesellschaft für Natur- und Völkerkunde Ostasiens* 26, 7-26, Tokyo 1932. ISIS

German translation from the Chinese of the *Fo shuo pao t'ai ching*, a sûtra "on entering the womb" or "on man's dwelling in the womb." It originally formed a part of the *Sarvâstivada nikâya vinaya samyukta vastu*, but the Sanskrit text is lost. It was translated from Sanskrit into Chinese by BODHIRUCI who flourished in the beginning of the VIIIth century. See PAUL PELLIOT's remarks in *Journal asiatique* (juillet 1914, 122-26) and those of MARCELLE LALOU (*ibidem*, vol. 211, 235 ff, 1927). This suggests that HUEBOTTER's translation, however valuable, cannot be considered final. The incertitudes due to the loss of the Sanskrit original might probably be cleared up by reference to the Tibetan version included in the *Kanjur*.
G. S.

Mackay, Ernest. Bead making in ancient Sind. *Journal of the American oriental society* 57, 1-15, 3 pl., 1937. ISIS

Mariadassou, Paramananda. Médecine traditionnelle de l'Inde. Conférences faites à l'école de médecine de Pondichéry (1932-1935). 3 vols., 267 p. 334 p., 365 + 28 p. Pondichéry, Imprimerie Sainte-Anne, 1934-1935. ISIS

Reviewed by J. FILLIOZAT, *Bulletin de la société française d'histoire de la médecine* 31, 61-3, 1937.

Pfister, R. Tissus imprimés de l'Inde médiévale. *Revue des arts asiatiques* 10, 161-64, 1937. ISIS

Ray, P. C. Progress of chemistry in ancient India. *Science and culture* 2, 497-500, 1937. ISIS

Sarton, George. A Hindu decimal ruler of the third millennium. *Isis* 26, 304-05, 1 fig., 1937. ISIS

Supplement to the article published in *Isis* 25, 323-26, 1936.

Walsh, E. H. C. Punch-marked silver coins. Their standard of weight, age, and minting. *Journal of the Royal Asiatic Society* 293-304, 2 fig., 1937. ISIS

10. — CHINA

Eberhard, Wolfram. Chinesische Volkskalender und buddhistisches Tripiṭaka. Bemerkungen und Zusätze zu den "Türkischen Turfantexten VII" von RACHMATI und EBERHARD. *OLZ* 40, 346-49, 1937. ISIS

Grabau, Amadeus William. The development of the natural sciences in China. *Science* 85, 551-53, 1937. ISIS

Granet, Marcel. La pensée chinoise. (*L'Evolution de l'humanité*, dirigée par HENRI BERR, no. 25 bis). XXIV + 614 p. Paris, la Renaissance du livre, 1934. ISIS

Extrait de l'avant-propos de H. BERR : "Comme dans la *Civilisation chinoise* (*Isis*, 16, 534), GRANET est plus occupé de saisir la vie collective, — ici la mentalité commune, — à travers les documents, — et la langue, l'écriture deviennent ainsi documents de premier ordre, — que de retrouver des doctrines et des individualités. En opposition à tous ceux qui ont cru l'histoire des doctrines réalisable, qui n'ont pas hésité à classer des écoles, qui font avec la philosophie occidentale des rapprochements arbitraires et aboutissent à des interprétations anachroniques, GRANET cherche à dégager la pensée chinoise, ou, comme il dit encore, l'orientation profonde de l'esprit chinois... La tâche est délicate : elle conduit cependant à des résultats plus sûrs que la tentative, à tout le moins prématurée, des historiens de la philosophie chinoise.

Il apparaît dans l'ensemble du volume... que trois traits accusés caractérisent la pensée chinoise.

Elle est orientée vers la culture, et non vers la pure connaissance... *Elle relie l'homme à l'univers*... Rien ne répond ici à notre spiritualisme : les Chinois ne songent pas à opposer le sujet à l'objet; ils les relient. Et rien ne répond non plus à notre rationalisme : *un ordre unique préside à la vie universelle, mais qui se réalise concrètement par l'Entente*, qui ne s'exprime pas abstraitement par la foi."

L. G.

Peake, Cyrus H. Recent studies on Chinese law. *Political science quarterly* 52, 117-38, 1937. ISIS

Rock, J. F. Hä-la or the killing of the soul as practiced by Na-khi sorcerers. *Journal of the West China border research society* 8, 53-8, 2 pl., 1 fig., 1936. ISIS

"Like the ancient Hawaiians, who had their sorcerers who could pray people to death and who were known as Kahuna ana-anà, so have the Na-khi or Mo-so tribe of north-western Yünnan dto-mba or priests who, besides driving out demons, could also pray people to death. This is called hä-la or the killing of the soul. When the soul was killed the man would of course be dead also."

Rock, J. F. The origin of the Tso-la books, or Books of divination of the Na-khi or Mo-so tribe. *Journal of the West China border research society* 8, 39-50, 1 pl., 6 fig., 1936. ISIS

"The Na-khi possess two types of books, one is called Tso-la, and the other simply Dto-mba t'ä-ghügh. The former are the books of divination

and comprise but a small fraction of the literature af the Na-kh , while the latter are chanted at the various ceremonies and form the bulk of their literature consisting of several thousand volumes. The Tso-la books differ outwardly also from the other books, in that they are sewn at the top instead of at the left side like the ordinary dto-mba books."

Rock, Joseph F. The Nichols Mo-so manuscript of the American geographical society. *Geographical review* 27, 229-39, 4 fig., 1937. ISIS

Schmitt, Erich. Einige verwendungen pulverisierten Porzellans in der chinesischen Medizin. *Paul Kahle Festschrift*, p. 211-16, Leiden, BRILL, 1935. ISIS

Têng, Ssu-yü ; Biggerstaff Knight. An annotated bibliography of selected chinese reference works. *Yenching Journal of Chinese studies*, monograph no. 12, 6 + 271 p. Peiping, 1936. American agent, Harvard University Press. ISIS

Contents : 1. Bibliographies; 2. Encyclopedias; 3. Dictionaries; 4. Geographical works; 5. Biographical works; 6. Tables; 7. Year-books; 8. Miscellaneous indexes — Combined index and glossary.

Reviewed by J. R. WARE, *Harvard journal of Asiatic studies* 2, 13-14, 1937.

Wang, Kwang-chi. Musikalische Beziehungen zwischen China und dem Westen im Laufe der Jahrtausende. *Paul Kahle Festschrift*, p. 217-24, Leiden, BRILL, 1935. ISIS

11. — JAPAN

Beaujard, A. Le théâtre comique des Japonais. Introduction à l'étude des kyôghen. 190 p. Paris, MAISONNEUVE, 1937. ISIS

Iba, Yasuaki. Fragmentary notes on astronomy in Japan. *Popular astronomy* 42, 243-52, 1934 ; 45, 301-10, 1937 ; to be continued. ISIS

See also *Isis* 22, 390. A. P.

Ono, Akitsugu. The paper industry and the paper trade of medieval (Japan). Chûsei ni okeru Seishigyô to Shishôgyô. *Rekishi chiri* 1936 (in Japanese). ISIS

Reviewed in *Harvard journal of Asiatic studies* 2, 102-08, 1937.

Peri, Noël. Essai sur les gammes japonaises. v + 70 p. (*Bibliothèque musicale du Musée Guimet*, 1). Paris, GEUTHNER, 1934. ISIS

Reviewed by HENRY GEORGE FARMER, *Journal of the royal Asiatic society* 497-99, 1937.

Rufus, W. Carl. Astronomy in Korea. *Transactions of the Korea Branch of the Royal Asiatic Society* 26, 1-48, 17 pl., Christian Literature Building, Seoul, Korea, 1936 (yen 3). ISIS

In spite of the author's modest disclaimer at the end of this paper (p. 48) "only the surface of the subject of Korean astronomy has been touched in this paper and a mere glimpse has been caught of the wealth of material", it is a rich collection of materials, many of them entirely new to me. The paper is followed by four tables and 34 very interesting illustrations. G. S.

Taniyama, Keirin. Nihon shakai jigyô dai-nempyô (Chronology of social service works in Japan) 22, 306 p. Tokyo, Tôkô shoin, 1936. ISIS

Reviewed by SHIO SAKANISHI, *Isis* 26, 480-81, 1937.

Toyoda, Takeshi. The medieval foundry industry in Japan. Chûsei no Imono-gyô. *Rekishi chiri* 1936 (in Japanese). ISIS

Reviewed in *Harvard journal of Asiatic studies* 2, 108-10, 1937.

12. — ISRAEL

(*Including works devoted to Palestine*)

Avi-Tonah, M. Map of Roman Palestine. Reprinted from the Quarterly of the department of antiquities in Palestine 5, 55 p., London, MILFORD, 1936. ISIS

Reviewed by O. G. S. CRAWFORD, *Geographical journal* 89, 286-87, 1937.

Brim, Charles J. Medicine in the Bible. xix + 384 p. New York, Froben Press, 1936. ISIS

Reviewed by M. F. ASHLEY-MONTAGU, *Isis* 27, 86-9, 1937.

Causse, A. L'humanisme juif et le conflit du judaïsme et de l'hellénisme. *Mélanges Franz Cumont*, p. 525-37, 1936. ISIS

Cook, Stanley Arthur. The development of the religion of Israel. *Mélanges Franz Cumont*, p. 539-50, 1936. ISIS

Dussaud, René. La notion d'âme chez les Israélites et les Phéniciens. *Syria* 16, 267-77, 1935. ISIS

Macdonald, Duncan Black. The Hebrew philosophical genius. x + 155 p. Princeton University Press, 1936. ISIS

Reviewed by JACOB S. MINKIN, *Isis* 27, 81-6, 1937.

Mézan, Saül. De GABIROL à ABRAVANEL. Juifs espagnols promoteurs de la Renaissance. 160 p. Paris, LIPSCHUTZ, 1937. ISIS

Pfeiffer, Robert H. Hebrews and Greeks before ALEXANDER. *Journal of biblical literature* 56, 91-101, 1937. ISIS

Romanoff, Paul. Onomasticon of Palestine. A new method in post-Biblical topography. With a preface by CHARLES C. TORREY. *Proceedings of the American Academy for Jewish Research* 7, x-p. 147-227, p. 83-90, 1937. ISIS

"The present study forms a section of an exhaustive work on Post-Biblical Topography, entitled 'Onomasticon of Palestine' (including Transjordan and Syria). It covers the vast field of Rabbinic literature from the first to the thirteenth century (Tannaitic, Amoraic, Midrashic, Geonic, and part of the Rishonim), also giving full references to Biblical, archaeological, and contemporary Greek and Latin sources as contained in the writings of the early Church Fathers and historians. I endeavored to trace the genealogy of the scholars of that period, and throw light on the history and traditions connected with the places discussed. Out of a group of place names beginning with the letter kâf, I present here a few items which will enable the reader to envisage the approach to the manifold problems of Palestinian topography, as pursued in the course of this investigation. The extensive Bibliography listing all the sources, manuscripts, incunabula, early and critical editions, as well as the modern scientific literature, used for the compilation of the Onomasticon, is here omitted for the sake of brevity."

Zolli, I. Una pagina di ostetricia biblica (es. I, 15-22). In memoria del mio diletto discepolo Dott. ENZO MARCONI. *Rivista di storia delle scienze mediche* 28, 69-77, 1937. ISIS

13. — IRAN

Cameron, George G. History of early Iran. xvi + 260 p. University of Chicago Press, 1936 ($ 3.00). ISIS

This study is primarily a political history of early Iran and Elam, and is chiefly concerned with the establishment of a synchrony between the events which there took place and those which occurred in Babylonia. From the dawn

of history to the rise of CYRUS is the period covered. Although there are a great number of unavoidable lacunae in the story which the author has to tell he has contrived to weave the available evidence together into a very coherent account which all who may be interested in the region and the period of which he writes will find invaluable. The author avoids all speculation and narrates the recovered facts alone, and if this perhaps makes for some dryness in the reading it at the same time makes the book a very useful work of reference to which one may turn without fear of picking up a conjecture for a fact. It can have been no easy task to write this book, and the author is to be heartily congratulated upon its successful completion. The text is assisted by good genealogical tables and a map. There is a good index.
M. F. A.-M.

Contenau, Georges ; Ghirshman, R. Fouilles de Tépé-Giyan, près de Néhavend, 1931 et 1932. vi + 144 p., 85 pl. (Musée du Louvre, département des antiquités orientales, série archéologique, 3). Paris, GEUTHNER, 1935. ISIS

Reviewed by C. N. SEDDON, *Journal of the Royal Asiatic Society*, 364-65, 1937.

Contenau, Georges. La civilisation de l'Iran au IV^e^ millénaire avant notre ère. 49 p., 25 fig., 1 map. Paris, Maisonneuve, 1936. ISIS

Reviewed by PIERRE BRUNET, *Archeion* 18, 417, 1936.

Elgood, Cyril. Medicine in Persia. xiv + 106 p., ill. (Clio medica). New York, HOEBER, 1934. ISIS

"The medical history of Persia falls naturally into two periods (pre-Muslim and Muslim), divided the one from the other by the battle of Nihawand. The first might well be termed the Avestan period... The second period is generally known to the historian as the Arabian period... In this work, I understand by the word Persia that area of the world which lies between the Tigris and the Euphrates on the one side and the modern India and Afghanistan on the other."

14. — ISLAM (*also Arabia*)

Audisio, Gabriel. La marqueterie de terre émaillée (mosaïque de faïence) dans l'art musulman d'Occident. 47 p. Alger, Imp. BASSET, 1926. ISIS

Farmer, Henry George. Was the Arabian and Persian lute fretted? *Journal of the Royal Asiatic Society* 453-60, 1 pl., 1937. ISIS

Fulton, A. S. Arabic medical manuscripts. *British museum quarterly* 11, 81-3, 1937. ISIS

MSS of the *Quwa al-adwiyat al-mufradah* composed in 964 by Abū Ja'far Aḥmad ibn Muḥammad ibn abī al-Asha'th (died Mosul 975) and of *Al-adwiyat al-mufradah* by Abu Bakr Ḥāmid ibn Samḥūn (fl. at Cordova, eleventh century). The arrangement of the latter work is alphabetical, in the order not of the Arabic but of the Hebrew alphabet. G. S.

Honigmann, E. Un itinéraire arabe à travers le Pont. *Mélanges Franz Cumont*, p. 261-71, 1 map, 1936. ISIS

Kratchkovskii, I. J. The history of Arabic literature and its objectives in the USSR. Trudy pervoi sessii Arabistov SSSR (in Russian). ISIS

This paper was read by the author at the first session of Arabists of the U.S.S.R. in June 1935. It is a very elaborate study of recent work not simply on Arabic literature but on Arabic science and culture, and not only in U.S.S.R. but in other parts of the world as well. An English translation is highly desirable. G. S.

Massé, Henri. Aspects du pèlerinage à la Mekke dans la poésie persane. *Mélanges Franz Cumont*, p. 859-65, 1936. ISIS

Mayer, L. A. Annual bibliography of Islamic art and archaeology India excepted. With the collaboration of Dja 'far Abd el-Kader, M. Oga-Oglu, M. Abdullah Chaghtai, R. Ettinghausen, Zaky M. Hassan, Vera Kratchkovskaya, C. J. Lamm, Abd ar-Razzaq Lutfi, M.-L. Plourin, St. Przeworski, A. van de Put, J. P. Vogel, J. Walker. Vol. 1, 1935. vii + 64 p. Jerusalem, Divan publishing house, 1937. ISIS

"In order to avoid overlapping with the Annual bibliography of Indian art and archaeology, published in so masterly a way by J. P. Vogel of the Kern Institute, Leiden, all items dealing with India are excluded. No reviews are noted which, although they appeared in 1935, deal with books or articles published in previous years."... "Pre-Islamic material is excluded by definition; if a book or article devoted to Sasanian or Byzantine art or archaeology has been noted, it is because it occasionally mention Islamic objects. With regard to exhibitions, the most important of those of the year under review has been placed at the head of the chapter in view of the vast literature it called forth; the others follow in alphabetical order of towns." Contents : 1. General; 2. Architecture; 3. Topography; 4. Fine arts; 5. Collections; 6. Script; 7. Numismatics; 8. Dress; 9. Heraldry; 10. Islamic influences; 11. Ethnography; 12. Excavations; 13. Personal; 14. Bibliography; 15. Varia; 16. Addenda to all sections. Every good wish to Prof. Mayer for the success of this undertaking. G. S.

Meyerhof, Max. Esquisse d'histoire de la pharmacologie et de la botanique chez les musulmans d'Espagne. III[e] congrès international d'histoire des sciences, Actes, conférences et communications, 243-49, Lisbon 1936. ISIS

Mingana, A. Arabic numerals. *Journal of the Royal Asiatic Society* 315-16, 1937. ISIS

"As we all know, in Arabic numbering the units come before the tens, with which they are united by the conjunction wa... In the heading of a Kûfi Qur'ân in my collection of Islamic Arabic manuscripts, numbered Mingana Arab. Isl. 1563, the above principle is contradicted, as the units are there placed after the tens."

Thomson, William. The renascence of Islam. *Harvard theological review* 30, 51-63, 1937. ISIS

Winderlich, R. Zur Alchemiegeschichte des Mittelalters. JULIUS RUSKA zum 70. Geburtstag. *Angewandte Chemie* 50, 125-26, 1937. ISIS

PART III

SYSTEMATIC CLASSIFICATION

I. SCIENCE IN GENERAL

15. — BIBLIOGRAPHY OF SCIENCE

Science Museum. Classification for works on pure and applied science in the Science Museum Library, 3rd edition. 132 p. London, Science Museum, 1936. ISIS

16. — HISTORY OF SCIENCE

Clark, G. N. Social and economic aspects of science in the age of NEWTON. *Economic history* 3, 362-79, 1937. ISIS

Criticism of Prof. B. HESSEN's theory in *Science at the cross roads* (London, 1931, *Isis* 20, 535).

Delevsky, J. L'histoire des sciences dans l'enseignement. *L'enseignement scientifique* 10, 241-47, 1937. ISIS

Diergart, Paul. Arbeiten von PAUL DIERGART in Bonn zur Geschichte der Naturwissenschaft, Medizin und Technik. *Proteus* 2, 327-354, 1937. ISIS

Drachman, Julian M. Studies in the literature of natural science. xii + 487 p., 6 pl. New York, MACMILLAN, 1936. ISIS

Reviewed by C. A. KOFOID, *Isis* 27, 89-90, 1937.

Enriques, Federigo; Santillana, G. de. Histoire de la pensée scientifique. I. Les Ioniens et la nature des choses. 76 p., ill. II. Le problème de la matière. Pythagoriciens et Éléates. 62 p., ill. III. Les derniers "physiologues" de la Grèce. 46 p. Paris, HERMANN, 1936. ISIS

Haberling, Wilhelm. Die Institute für Geschichte der Medizin und der Naturwissenschaft in Deutschland. 3. Das Institut für Geschichte der Medizin an der Medizinischen Akademie in Düsseldorf. *Mitt. zur Gesch. d. Med., d. Naturw. u. d. Techn.* 36, 145-47, 1937. ISIS

Hornberger, Theodore. Science and the New world (1526-1800). An exhibition to illustrate the scientific contributions of the New World and the spread of scientific ideas in America. 18 p., 2 fig. San Marino, Henry E. Huntington Library, 1937. ISIS

Ingenious catalogue of a very interesting exhibition. There are 39 items, the first being OVIEDO Y VALDÉS : *De la natural hystoria de las Indias* (Toledo 1526), the first account of the natural history of the New World (a cactus used as a tailpiece is taken from a French edition of the same work, Paris 1556). The last item WILLIAM SMITH : *A general idea of the College of Mirania* (New York 1753). G. S.

Osiris. Studies on the history and philosophy of science, and on the history of learning and culture. Edited by GEORGE SARTON. Vol. I : A volume of studies on the history of mathematics and the history of science presented to Prof. D. E. SMITH. 777 p. : Vol. II : Dedicated to Sir THOMAS HEATH, historian of Greek mathematics and astronomy. 550 p. Bruges, 1936. ISIS

Reviewed by JULIUS RUSKA, *DLZ*, 1198-1200, 1937.

Perna, Alfredo. Les cours d'histoire des sciences en Italie. III^e^ congrès international d'histoire des sciences, Actes, conférences, et communications, 113-20, Lisbon, 1936. ISIS

(Prague, 1937). IV^e Congrès international d'histoire des sciences à Prague en 1937. *Isis* 26, 452-3, 1937. ISIS

Proteus, Band 2. Festgabe für OTTO VOGEL (Düsseldorf) und JULIUS RUSKA (Berlin). Unter Mitwirkung namhafter Fachgeschichtsforscher bearbeitet und herausgegeben von PAUL DIERGART. Verhandlungsberichte und Abhandlungen der Rheinischen Gesellschaft für Geschichte der Naturwissenschaft, Medizin und Technik (Hauptsitz Bonn) anlässlich ihres 25-jährigen Bestehens im November 1936. 371 p. Bonn, NEUENDORFF, 1937. ISIS

This volume edited by PAUL DIERGART of Bonn, who is the main promoter of history of science studies in the Bonn country, is analyzed in the present bibliography. G. S.

Rainov, T. I. Three jubilees (LAGRANGE, WATT, AMPÈRE). *Sorena,* no. 7, 91-102, 3 port.; no. 8, 66-79, 1936 (in Russian). ISIS

Rey, Abel. Indications concernant une direction d'étude relative à l'histoire des sciences, du point de vue de leurs méthodes (d'après une conférence de ABEL REY). *Thalès* 2, 34-48, 1935 (Paris 1936). ISIS

Reymond, Arnold. Réflexions sur l'enseignement de l'histoire des sciences. III^e congrès international d'histoire des sciences, Actes, conférences et communications, 120-26, Lisbon, 1936. ISIS

Rosenstock-Huessy, Eugen. A classic and a founder. I. The scientific grammar of MICHAEL FARADAY's *Diaries*; II. The tripartition in the life of THEOPHRASTUS PARACELSUS. Contributions to the philosophy of the sciences. 73 p. (mimeographed edition). Hanover, N. H., the Author, 1937. ISIS

Sarton, George. The study of the history of science. 76 p. Cambridge, Mass., Harvard University Press, 1936. ISIS

Reviewed by A. CASTIGLIONI, *Rivista di storia delle scienze mediche* 28, 55-6, 1937; by EDMUND O. VON LIPPMANN, *Die Naturwissenschaften* 25, 91, 1937; by GINO LORIA, *Il bollettino di matematica* xl-xliii, June 1937; by HÉLÈNE METZGER BRUHL, *Archeion* 18, 376-80, 1936; by CHARLES F. MULLETT, *Psychological bulletin* 34, 310-16, 1937; by JOHAN NORDSTRÖM, *Lychnos* 2, 515-16, Uppsala 1937 (in Swedish); by DAVID EUGENE SMITH, *Scripta mathematica* 4, 263-65, 1937; by QUIDO VETTER, *Priroda* 30, 95, 1937; and by KURT VOGEL, *Mitt. z. Gesch. d. Med., d. Naturw. u. d. Techn.* 36, 228, 1937.

Sarton, George. Forty-eighth Critical bibliography of the history and philosophy of science and of the history of civilization. (to end of September 1936 — with special reference to Iran and Islam) *Isis* 26, 490-604, 1937. ISIS

"This forty-eighth Bibliography contains about 695 items of which 105 deal with Iran and Islam. They have been kindly contributed by nine scholars belonging to four different countries."

Sarton, George. Forty-ninth Critical bibliography of the history and philosophy of science and of the history of civilization (to end of December 1936 — with special reference to sections 15 to 19). *Isis* 27, 117-200, 1937. ISIS

"This forty-ninth Bibliography contains about 525 items of which 95 deal with Science in general and Logic. They have been kindly contributed by eight scholars belonging to four different countries."

Sarton, George. Materials for the history of the history of science. *Isis* 27, 6-8, 1937. ISIS

"It may be worthwhile to put together as has been done in the following list all the articles devoted to historians of science and to scientific philosophers which have hitherto appeared in *Isis* and *Osiris*. Indeed these articles constitute materials of the first order for any retrospective survey of our studies. Each is valuable in itself, and enhances the value of every other. It is hoped that this collection will be appreciated by our readers and that it will encourage them to complete it. Each volume of *Isis* should contain at least one article reviewing the life and work of one of our predecessors."

Vetter, Quido. L'histoire des sciences en Tchéco-Slovaquie. *Lychnos* 2, 243-47, Uppsala 1937. ISIS

17. — ORGANIZATION OF SCIENCE

(Internal organization is meant, see Isis 1, 195. *For external organization, national or international, see section* 55).

Adams, Charles C. The relation of natural resources to regional and county planning. *New York state museum bulletin* 310, 121-41, 1937. ISIS

Crowther, J. G. Soviet science. x + 342 p., 16 pl. New York, DUTTON, 1936. ISIS

Reviewed by C. A. KOFOID, *Isis* 27, 90-2, 1937.

18. — PHILOSOPHY OF SCIENCE

Actes du Congrès international de philosophie scientifique, Paris 1935. Actualités scientifiques et industrielles, nos. 388 à 395. Paris, HERMANN, 1936. ISIS

I. Philosophie scientifique et empirisme logique : rationalisme empirique et empirisme logique; physicalisme et critique de la métaphysique (82 p.). II. Unité de la science : biologie; psychologie et sociologie; encyclopédie (une encyclopédie internationale de la science unitaire sera publiée par l'Institut Mundaneum de la Haye) (78 p.). III. Langage et pseudo-problèmes : sémantique, langage et logique; pseudo-problèmes (62 p.). IV. Induction et probabilité (66 p.). V. Logique et expérience : définition et expérience; formalisation de l'expérience; énoncés protocolaires (82 p.). VI. Philosophie des mathématiques : logique, mathématiques et réalité; logique et théorie des groupes; les antinomies cantoriennes, la logique intuitioniste et le tiers exclu (68 p.). VII. Logique : syntaxe logique; logique mathématique et épistémologie (74 p.). VIII. Histoire de la logique et de la philosophie scientifique (24 p.).

Bauer, E. ; Broglie, L. de ; Serrus, C. ; Brunschvicg, L. ; Rey, A. L'évolution de la physique et la philosophie. x + 151 p., Paris, ALCAN, 1935. ISIS

Rapports entre la physique actuelle et la philosophie. Réflexions d'un physicien sur la nouvelle théorie des quanta et la nouvelle mécanique. L'espace et le temps en physique et en philosophie. Finesse et géométrie. Physique et réel. Chacun de ces exposés est suivi de discussions auxquelles ont pris part les assistants à la quatrième semaine internationale de synthèse (1933).
L. G.

Beck, M. L'irrationalisme actuel. Sa nature, ses origines et le moyen de le surmonter. *R. de métaphys. et de mor.* 41, 459-70, 1934. ISIS

Bohr, Niels. Causality and complementarity. *Philosophy of science* 4, 289-98, 1937. ISIS

Boll, Marcel. La science des caractères dans ses relations avec la méthode scientifique (Actualités scientifiques et industrielles). 40 p. Paris, HERMANN, 1936. ISIS

Bouligand, Georges. Relations d'incertitude en géométrie et en physique. Préf. de L. DE BROGLIE. 28 p. Paris, HERMANN, 1934. ISIS

Destouches, Jean-Louis. Les notions d'espace et de temps dans leurs rapports avec les théories atomiques. *Thalès* 2, 136-41, 1935 (Paris 1936). ISIS

Develsky, J. La prévision historique dans la nature. 54 p. (Exposés de philosophie des sciences publiés sous la direction de L. DE BROGLIE, 7). Paris, HERMANN, 1935. ISIS

Dingle, Herbert. Modern Aristotelianism. *Nature* 139, 784-86, 1937. ISIS

Dugas, René. La méthode physique au sens de DUHEM devant la mécanique des quanta. *Revue générale des sciences* 48, 68-71, 1937. ISIS

Frank, Philipp. Théorie de la connaissance et physique moderne. Trad. de l'allemand par E. VOUILLEMIN, revue et mise à jour par l'auteur. Introd. de MARCEL BOLL. 54 p. Paris, HERMANN, 1934. ISIS

Houston, W. V. The philosophy of physics. *Science* 85, 413-19, 1937. ISIS

Levy, H. Modern Aristotelianism. *Nature* 139, 1025-26, 1937. ISIS

Malisoff, William Marias. Arranging the sciences. I. An experiment. *Philosophy of science* 4, 261-64, 1 fig., 1937. ISIS

Matisse, Georges. Interprétation philosophique des relations d'incertitude et déterminisme. 30 p. (Actualités scientifiques et industrielles). Paris, HERMANN, 1936. ISIS

Milne, E. A. On the origin of laws of nature. *Nature* 139, 997-999, 1937. ISIS

"In *Nature* of May 8, we published an article by Dr. HERBERT DINGLE entitled 'Modern Aristotelianism'. The article, as letters from a number of correspondents showed, created considerable interest, and it was decided to invite further contributions on the subject from a number of representative investigators. Prof. E. A. MILNE, who was singled out by Dr. DINGLE for particular criticism, has sent an article expounding the ideas behind his recent work and touching on many of the points under discussion. This serves as an opening article to a series of contributions, many of them sent

in the form of 'Letters to the Editor', which have been arranged roughly in the order of their content under the general title of 'Physical science and philosophy'. Finally, Dr. DINGLE has summed up the discussion and dealt with some of the main points raised. It is hoped that a useful purpose will have been served by bringing together in this way a number of contributions bearing on the old question of the relation of physics to philosophy."

Moulton, F. R. Science. *Science* 85, 571-75, 1937. ISIS

Neurath, Otto. Unified science and its encyclopaedia. *Philosophy of science* 4, 265-77, 1937. ISIS

Pacotte, Julien. Le physicalisme dans le cadre de l'empirisme intégral. 54 p. (Actualités scientifiques et industrielles). Paris, HERMANN, 1936. ISIS

Schlick, Moritz. Les énoncés scientifiques et la réalité du monde extérieur. Traduction de l'allemand par ERNEST VOUILLEMIN, revue et mise à jour par l'auteur. Introd. de M. BOLL. 54 p. Paris, HERMANN, 1934. ISIS

Schlick, Moritz. Sur le fondement de la connaissance. Trad. du Général VOUILLEMIN. 56 p. Paris, HERMANN, 1935. ISIS

Stern, Alfred. La philosophie des valeurs. Regard sur ses tendances actuelles en Allemagne. 74 + 62 p. (*Exposés d'histoire et philosophie des sciences*, 4 et 5). Paris, HERMANN, 1936. ISIS

II. FORMAL SCIENCES (Knowledge of forms)

19. — LOGIC AND THEORY OF KNOWLEDGE

Benjamin, A. Cornelius. The logical structure of science. 344 p. (Psyche monographs, 9). London, KEGAN PAUL, 1936. ISIS

"I wish only to state my firm conviction that all science and philosophy must start with the given. But the range of the given is not definite. There are things which are clearly given and obvious, but there are also things which are obscurely given and conjectural. It is the task of science and philosophy to symbolize this *total* realm of the given, through the discovery of relations connecting the clearly given with the obscurely given. In terms of such relations we may *derive* the obscurely given from the clearly given and *explain* the clearly given by the obscurely given. The position which I shall defend is positivistic in its insistence that one should begin with the clearly given and that only in terms of this realm should one talk about the

obscurely given. Thus it insists upon the essentiallity of methods of construction and reduction. But it is anti-positivistic in its insistence that one should not give to all constructions and derivations an unreal or a non-existential status. Hence it does not deny hypothetical entities but merely gives them the status of obscure entities. Positivism fails to explain why we are not satisfied with mere description. I have tried to meet this difficulty by insisting that the obscure is part of the given. Crudely stated, the obscure is hinted at in the obvious."

Carnap, Rudolf. L'ancienne et la nouvelle logique. Trad. de l'allemand par ERNEST VOUILLEMIN, revue et mise à jour par l'auteur. Introd. de MARCEL BOLL. 38 p. Paris, HERMANN, 1933. ISIS

"Après avoir énoncé les insuffisances de la logique classique, C. définit les tendances nouvelles (logique symbolique, logique des relations, antinomies logiques). La mathématique devient une branche de la logique, c'est à dire que l'une comme l'autre sont uniquement tautologiques; au contraire, toute proposition qui comporte un contenu, est *nécessairement* d'origine expérimentale. Ainsi se rélise à la fois l'unité de la science — quant à sa méthode — et l'élimination de la métaphysique. Toute question, dont on ne saurait réaliser ou concevoir un contrôle expérimental, est dépourvue de signification *au regard de la science*. Restent les croyances invérifiables et je ne pense pas être éloigné du point de vue de l'*Ecole de Vienne* [dont R. CARNAP et HANS REICHENBACH sont les chefs de file], en rattachant celles-ci à la psychologie affective, qui ne peut tarder à rendre compte de leurs origines, de leur genèse, de leur pseudo-contenu, de leur intensité et de leur persistance."

Keyser, Cassius Jackson. Panthetics. *Scripta mathematica* 4, 126-38, 1936. ISIS

Neurath, Otto. Le développement du Cercle de Vienne et l'avenir de l'empirisme logique. Trad. du Général VOUILLEMIN. 60 p. Paris, HERMANN, 1935. ISIS

Pacotte, Julien. La logique et l'empirisme intégral. (Exposés de philosophie des sciences publiés sous la direction de L. DE BROGLIE, 5). 56 p. Paris, HERMANN, 1935. ISIS

Vouillemin, Général. La logique de la science et l'École de Vienne. 46 p. Paris, HERMANN, 1935. ISIS

20. — MATHEMATICS

Bouligand, Georges. La causalité mathématique. *Thalès* 2, 23-9, 1935 (Paris 1936). ISIS

Carver, W. B. Thinking versus manipulation. *American mathematical monthly* 44, 359-63, 1937. ISIS

"We would probably all agree that mathematics consists, not in the correct manipulation of symbols, but in clear and logical thinking about certain concepts and relationships which the mathematical symbols represent. It is characteristic of all symbolism that there is a constant tendency for the symbol to replace the thing symbolized; and it is very easy to allow mathematical symbols to obscure mathematical ideas. If one should memorize and reproduce correctly the sounds which constitute a sentence in the Russian language without knowing anything of their significance, he would not be speaking Russian — he would merely be making Russian noises. And if a student in the classroom goes through a correct piece of manipulation of mathematical forms without understanding the meaning and significance of the processes, his work is not mathematics at all — he is merely making mathematical marks. The vast short-hand symbolism we have invented to record and communicate mathematical ideas is only the language of mathematics, and language is a very doubtful asset to any one who has no ideas to communicate. If this concept of mathematics is correct at all, it follows at once that as teachers of this subject our primary aim should be to help the student to a clear understanding of mathematical ideas and relationships, and to encourage him to develop the ability to think for himself so that he may arrive under his own power at conclusions in which he will have confidence."

Jelitai, Josef. Zur Geschichte der Mathematik in Ungarn. *Archeion* 18, 350-54, 1936 (received 1937). ISIS

Karpinski, Louis C. Is there progress in mathematical discovery and did the Greeks have analytic geometry? *Isis* 27, 46-52, 1937. ISIS

Myller, A. Le développement de l'enseignement mathématique à l'université de Iaşi. *Revistă ştiintifica Adamachi* 22, 3-9, 1935 (en roumain). ISIS

Neugebauer, Otto. The history of mathematics. *National mathematics magazine* 11, 5-11, 1 port., 1936. ISIS

Translated by G. WALDO DUNNINGTON, with a biography of the author and portrait.

Ogura, Kinnosuke. Sûgaku-shi kenkyû (Studies in the history of mathematics : series 1) 10, 340 p., illus. Tokyo, Iwanami shoten, 1935. ISIS

Reviewed by SHIO SAKANISHI, *Isis* 26, 481-82, 1937.

Sarton, George. The study of the history of mathematics. 113 p. Cambridge, Harvard University Press, 1936. ISIS

Reviewed by G. WALDO DUNNINGTON, *National mathematics magazine* 11, 204, 1937; by GINO LORIA, *Il bollettino di matematica* xl-xliii, June 1937; by ALDO MIELI, *Archeion* 18, 380, 1936 (received 1937); by E. H. NEVILLE, *Mathematical gazette* 21, 71-72, 1937; C. W. OSEEN, *Lychnos* 2, 526, Uppsala 1937 (in Swedish); by DAVID EUGENE SMITH, *Scripta mathematica* 4, 263-66, 1937; by D. J. STRUIK, *Science and Society* 1, 425-29, 1937; and by KURT VOGEL, *Mitt. z. Gesch. d. Med., d. Naturw. u. d. Tech.* 36, 235, 1937.

Sergescu, P. La vie contemporaine des mathématiques. *Revue de l'Université de Bruxelles* no. 2, 110-33, 1937. ISIS

Simons, Lao G. The adoption of the method of fluxions in American schools. *Scripta mathematica* 4, 207-19, 1937. ISIS

"From the middle to the end of the 18th century, theses relating to fluxions occur on the Commencement broadsides of Harvard, Yale, and Rhode Island Colleges, as they probably do at other American colleges established by this time. These truths are sufficiently advanced in character to indicate that a real study of this subject was going on under the direction of a scholarly professor. In one case, Harvard, 1751, it is associated with the study of NEWTON's *Principia*. This beginning did not, perhaps, bear immediate fruit, for the first textbook prepared for use at Harvard contained no work on fluxions. Moreover, only one problem on fluxions is found before 1803 among the problems presented to the department of mathematics by the members of the junior and senior classes during the period 1782-1815, although the number increases thereafter. The notebook material of the period through the first quarter of the 19th century is limited to brief sections in several books and a single extended book. This complete treatment of the subject of fluxions has for its source NEWTON's own work rather than one of the several works of his imitators which appeared after his method became known. This study shows then the almost complete dominance of the great NEWTON himself in American schools as far as the subject of fluxions is concerned. By the end of the first quarter of the 19th century, the catalogue of at least one college, Yale, shows that fluxions had been accorded a place among electives for the student body."

Tropfke, Johannes. Geschichte der Elementar-Mathematik in systematischer Darstellung, mit besonderer Berücksichtigung der Fachwörter. Dritter Band, Proportionen, Gleichungen. Dritte, verbesserte und vermehrte Auflage. 239 p. Berlin, DE GRUYTER, 1937 (RM 10, geb. 11.). ISIS

We are glad to announce the publication of volume 3 of this monumental work in its third edition. The second edition which appeared in 1922 (covered 151 p.,) the third 239. Ingenious tables establish a correlation between the page numbers of both editions, and thus enable one to use the old index. G. S.

Yeldham, Florence A. The teaching of arithmetic through 400 years, 1535-1935. 143 p., frontispiece, facs. London, HARRAP, 1936. ISIS

Reviewed by LOUIS C. KARPINSKI, *Isis* 27, 92-4, 1937.

21. — STATISTICS

(History and methods. Tables and generalities. For the applications, refer to the sciences to which they are applied).

Huber, Michel. Quarante années de la statistique générale de la France (1896-1936). *Journal de la société de statistique de Paris* 78, 179-213, 1937. ISIS

Penglaou, Ch. La statistique existe-t-elle en tant que discipline autonome? *Journal de la société de statistique de Paris* 78, 130-62, 1937. ISIS

III. PHYSICAL SCIENCES

(Knowledge of inorganic nature)

22. — MECHANICS

(Including celestial and atomical mechanics)

Bachelard, Gaston. La dialectique de la durée. 172 p. Paris, BOIVIN, 1936. ISIS

Destouches, Jean Louis. Les principes de la mécanique générale. 54 p. Paris, HERMANN, 1934. ISIS

Dingle, H. The measurement of time. *Nature* 139, 355-57, 1937. ISIS

Dugas, René. La méthode de la mécanique des quanta (Axiomatique, déterminisme et représentation. 60 p. (Exposés de philosophie des sciences). Paris, HERMANN, 1935. ISIS

Lynch, Arthur. The case against EINSTEIN. xxx + 275 p. London, ALLAN, 1932. ISIS

Reviewed by T. G., *Nature* 131, 260, 1933.

Sesmat, Augustin. Systèmes de référence et mouvements. (Physique classique). (*Actualités scientifiques et industrielles*). 690 p. ill. Paris, HERMANN, 1937. (105 fr.). ISIS

Sesmat, Augustin. Systèmes de référence et mouvements (Physique relativiste). (*Actualités scientifiques et industrielles*). 450 p., ill. Paris, HERMANN, 1937 (76 fr.). ISIS

"Nous avons consacré une assez longue étude historique et critique *au système de référence absolu* classique et au discernement des mouvements réels. Voici comment cette étude pourrait en deux mots se résumer : la Mécanique de NEWTON admettait, on le sait, un privilège commun de tous les systèmes d'inertie par rapport aux systèmes accélérés; l'Optique de FRESNEL, et l'Electromagnétisme de MAXWELL et de LORENTZ, admettaient, en plus, l'existence d'un système d'inertie privilégié par rapport à tous les autres systèmes d'inertie; selon nous, si l'on veut pousser à bout les principes de NEWTON, on est conduit à admettre en Mécanique aussi un système d'inertie privilégié par rapport à tous les autres, et le même qu'en Optique et en Electro-Magnétisme. Autrement dit il existe en droit pour toutes les lois de la physique classique non seulement toute une catégorie de systèmes relativement privilégiés, mais encore un système jouissant d'un privilège unique. Que devient cette thèse dans la physique de la relativité, dont le nom évoque l'idée toute opposée d'une équivalence de tous les systèmes de référence ? Le présent travail a pour but précis de répondre à cette question. Comme on peut s'y attendre, il comprendra à la fois un exposé et une critique des principes de la nouvelle physique, et tout spécialement de ceux qui concernent le rôle des systèmes de référence — ou de leur équivalent — dans les théories : *la conclusion sera qu'il existe encore des systèmes privilégiés dans la physique relativiste.*"

Van den Dungen, F. H. Lois et postulats. *Revue de l'Université de Bruxelles* 40, 214-30, 1934-35. ISIS

Brève et originale esquisse des progrès de la mécanique depuis NEWTON.
J. P.

Walden, Paul. Materie und Energie. *Chem.-Ztg.* 57, 813-14, 1933. ISIS

23. — ASTRONOMY

Antoniadi, Eugene Michel. La planète Mercure et la rotation des satellites. Etude basée sur les résultats obtenus avec la grande lunette de l'observatoire de Mendon. 76 p., 36 fig., 3 pl., Paris, GAUTHIER-VILLARS, 1934. ISIS

Reviewed by PIERRE BRUNET, *Archeion* 17, 299, 1935.

Arrhenius, Svante (1859-1927). Die Sternenwelt. 2. Tl. : Erde und Weltall. Nach hinterlassenen Aufzeichnungen bearbeitet und ergänzt von KNUT LUNDMARK. Übersetzt von ALEXIS FINKELSTEIN. vi + 358 p., 1 pl., 61 fig. Leipzig, Akadem. Verlagsgesellsch. 1931. ISIS

Reviewed by P. KIRCHBERGER, *DLZ* 3, 1288-90, 1932.

Barneck, Alfred. Die Grundlagen unserer Zeitrechnung. 2. Aufl. 49 p., 9 fig. (*Math.-phys. Bibliothek* 29). Leipzig, TEUBNER, 1932. ISIS

Bassermann-Jordan, Ernst von. Die Geschichte der Zeitmessung und der Uhren. Bd. 1, Lieferung F : KARL SCHOY, *Gnomonik der Araber*, 1923. viii + 95 p. Lieferung E : JOSEPH DRECKER, *Theorie der Sonnenuhren*, 1925. 112 p. Berlin, DE GRUYTER. ISIS

Reviewed by E. ZINNER, *Vierteljahrsschrift der Astronomischen Gesellschaft* 68, 39-46, 1933.

Bellamy, Hans Schindler. Moons, myths and man. A reinterpretation. 358 p., illus. London, FABER and FABER, 1936. ISIS

Beyer, Hermann. Mayan hieroglyphs : The variable element of the introducing glyphs as month indicator. *Anthropos* 26, 99-108, 3 pl., 4 fig., 1931. ISIS

Black, Frederick Alexander. The calendar and its reform. viii + 80 p., 3 pl. London, GALL and INGLIS, 1932. ISIS

Reviewed in *Nature* 131, 859, 1933.

Bork, Ferdinand. Die Geschichte des Weltbildes. iv + 150 p., 18 fig. (*Ex Oriente Lux* 3). Leipzig, PFEIFFER, 1930. ISIS

Cumont, Franz. Adonis et Canicule. *Syria* 16, 46-50, 1935. ISIS

"Il y a quelques années nous avons essayé de montrer dans cette revue, en nous fondant sur les Actes des saintes JUSTE et RUFINE, que les fêtes d'ADONIS se célébraient sous l'Empire romain le 19 juillet, date où l'on avait fixé dans le calendrier julien le lever matinal du Chien et le début de l'année sothiaque ou caniculaire. C'est ce jour-là que l'empereur JULIEN, entrant dans Antioche, entendit, suivant AMMIEN MARCELLIN, les lamentations des femmes qui sur les terrasses de leurs maisons pleuraient la mort du jeune

dieu. C'est aussi à ce moment que, selon MANILIUS, des prêtres, montant sur une cime du Taurus, prédisaient d'après leurs observations une récolte bonne ou mauvaise, des épidémies ou des guerres. J'ai réuni récemment plusieurs textes astrologiques d'où il résulte qu'en Syrie on avait coutume, en effet, de tirer des pronostics de l'état du ciel au moment du lever de Sirius." Cet article a été suggéré à l'auteur par la publication du traité d'astrologie d'AL-BÎRÛNÎ par R. R. WRIGHT (1934; *Isis* 23, 448-50). G. S.

Gundel, Wilhelm. Sternglaube, Sternreligion und Sternorakel. 159 p., 1 pl., 2 fig. (*Wissenschaft u. Bildung* 288). Leipzig, QUELLE und MEYER, 1933. ISIS

Hogrebe, J. Altnordische Beobachtungs- und Messkunst an der Sonnenbahn. *Z. math. natw. Unterr.* 65, 23-8, 1934. ISIS

Hubble, Edwin. The realm of the nebulae. xiii + 210 p., 15 pl. (Yale University : Mrs. Hepsa Ely Silliman memorial lectures). London, Oxford University Press, 1936. ISIS

Reviewed by J. H. J., *Nature* 138, 859-60, 1936.

Kelényi, Béla Ottó. Geschichte der ungarischen Astronomie. 106 p., 14 fig. (Astron. Abh. d. K. Ung. Astrophysikalischen Observatoriums von KONKOLY's Stiftung in Budapest-Svábhegy, 1). Budapest 1930. ISIS

Le Maire, Octave. Observatoires d'astronomie à Malines, 1775-1895. *Ciel et terre* 51, 201-03, 1935. ISIS

Lithberg, Nils. Almanackan. Från astrologisk rådgivare till svensk kalender. 64 p., 15 fig. (*Svenska humanistiska förbundet*, 40). Stockholm, NORSTEDT, 1933. ISIS

Reviewed by ZAUNICK, *Mitt. zur Gesch. d. Med., Naturw. u. d. Techn.* 33, 62, 1934.

Ludendorff, Hans. Über astronomische Inschriften der Maya. *Forschg. u. Fortschr.* 10, 101-02, 1934. ISIS

Macpherson, Hector. Makers of astronomy. viii + 244 p., 9 ill. London, Oxford University Press, 1933. ISIS

Reviewed by ALDO MIELI, *Archeion* 15, 277-78, 1933; in *Nature* 132, 804, 1933.

McColley, Grant. The theory of the diurnal rotation of the earth. *Isis* 26, 392-402, 1937. ISIS

"In the *Experimenta Nova* of 1672, the German scientist OTTO VON GUERICKE describes in some detail the four astronomical conceptions active in his day. These are, he says, the Ptolemaic, the Copernican, the Tychonic, and what he terms 'De Systemate alio', or that of the diurnal rotation of the earth. The first three of these interpretations have received more or less adequate historical treatment, with the result that their continuity, persistence, and influence are comparatively well known. Unfortunately, this is not the case with the theory of diurnal rotation, the oldest and not the least important of the four."

Michel, H. Quatre instruments anciens de l'Observatoire royal de Belgique. *Ciel et terre* 53, 129-34, ill., 1937. ISIS

Mineur, H. Histoire de l'astronomie stellaire jusqu'à l'époque contemporaine. (*Actualités scientifiques et industrielles*, 115). Paris, HERMANN, 1934. ISIS

Müller, Rolf. Der Sonnentempel in den Ruinen von Tihuanacu. Versuch einer astronomischen Altersbestimmung. *Baessler-Archiv* 14, 123-42, 1931. ISIS

Reviewed by ZINNER, *Mitt. z. Gesch. d. Med.* 31, 271, 1932.

Müller, Rolf. Himmelskundliche Ortung auf nordisch-germanischem Boden. Wie beobachteten unsere Verfahren die Auf- und Untergänge von Sonne, Mond und Sternen? 85 p., 43 fig., 8 pl. Leipzig, KABITZSCH, 1936. ISIS

Reviewed by ULRICH BAEHR, *DLZ* 58, 594-98, 1937.

Neugebauer, Paul Victor. Spezieller Kanon der Sonnenfinsternisse für Vorderasien und Aegypten für die Zeit von 900 v. Chr. bis 4200 v. Chr. Unter Mitwirkung von R. HILLER 32 p., 66 maps, 17 pl. (Astronomische Abhandlungen. Ergänzungshefte zu den Astronomischen Nachrichten, 8). Kiel 1931. ISIS

Reviewed by E. O. FORRER, *American journal of Semitic languages* 49, 340, 1933.

Nicolson, Marjorie. The "new astronomy" and English literary imagination. *Studies in philology* 32, 428-62, 1935. ISIS

In these two papers Miss M. NICOLSON, Dean of Smith College, well known to our readers because of her admirable *Conway letters* (1930; *Isis*

16, 141-43), has studied the literary repercussions (chiefly in England) of the "new astronomy", that is, not the Copernican astronomy, but rather the Keplerian and Galileian. The book which fired the imagination of English poets was not the *De revolutionibus orbium coelestium* of COPERNICUS, but the *Sidereus nuncius* of GALILEO (1610). G. S.

Nicolson, Marjorie. The telescope and imagination. *Modern philology* 32, 233-60, 1935. ISIS

Nicolson, Marjorie. A world in the moon. A study of the changing attitude toward the moon in the seventeenth and eighteenth centuries. *Smith College studies in modern languages* 17, v-72 p., frontispiece, 1936. ISIS

This is the fifth article of a series devoted to the study of literary repercussions of scientific discoveries, chiefly in England and in the seventeenth and eighteenth centuries. See the four notes devoted to Dean NICOLSON in this *Critical Bibliography*. "The present article continues the same general themes, though it is in some ways introductory to a second group of studies. Its immediate origin is again to be found in the *Sidereus Nuncius* but it isolates one theme from the many suggested by GALILEO's earliest telescopic observations — the nature of the moon. Like the earlier articles, this one attempts to show the way in which poetic, satiric, religious, and philosophical imagination seized upon new proof for old ideas and also developed ideas not possible before telescopic observation." G. S.

Norman, Daniel. Maya astronomy. *The telescope* 4, 46-50, 62, 3 fig., 1937. ISIS

Ritchey, George Willis. L'évolution de l'astrophotographie et les grands télescopes de l'avenir (The development of astrophotography and the great telescopes of the future). Introduction by L. DELLOYE. 36-34 pl. Paris, Société astronomique de France, 1929. ISIS

Reviewed by R. A. S., *Nature* 125, 169, 1930.

Sangin, Mstislav Antonini F. Catalogus codicum astrologorum graecorum. Codices rossicos. Adiuvante Instituto historiae scientiarum et artium technicarum academiae scientiarum URSS. Tomus XII. viii + 268 p., 6 pl. Bruxelles, LAMERTIN, 1936. ISIS

Reviewed by GEORGE SARTON, *Isis* 26, 483-84, 1937.

Sarton, George; Tannery, M. P. Appel pour l'achèvement du Système du monde de DUHEM. *Isis* 26, 302-03, 1937. ISIS

Schellhas, Paul. Zeitrechnung und Astronomie bei den Maya. *Das Weltall* 30, 149-51, 1931. ISIS

Slavenas, P. Die Bewegung des Mondes. Übersicht über das Problem von Altertum bis heute. *Kosmos* 12, 165-81, Kovno, 1931 (in Lithuanian), ISIS

Sticker, Bernhard. Anschauung und Erlebnis als Quellen des alten Himmelsbildes. *Proteus* 2, 54-8, 1937. ISIS

Svenonius, Björn. Quelques essais d'identification de constellations sur les rochers sculptés en Ostrogothie (Suède). 16 p. (Meddelande från Lunds astronomiska observatorium, ser. II, no. 83). Lund GLEERUP 1937. ISIS

"Les nombreuses combinaisons de cupules qu'on a trouvé gravées sur des rochers en divers endroits ont été interprétées, dans certains cas, comme représentant des constellations. Parmi les savants qui ont contribué à développer ou à soutenir cette théorie si intéressante, quoique apparemment hypothétique des images sculptées préhistoriques, il faudra nommer MM. M. BAUDOUIN, T. GRAVLUND, G. SCHÜTTE et K. LUNDMARK. Les identifications déjà faites ne sont pourtant ni nombreuses ni particulièrement convaincantes. Chaque nouvelle contribution aux matériaux déjà rassemblés doit donc avoir de l'intérêt. C'est dans cet espoir que l'auteur a examiné, en ce qui concerne cette hypothèse, les rochers sculptés d'Ostrogothie, une province suédoise qui en est assez riche, en se servant des reproductions qui se trouvent dans l'excellente monographie de M. A. NORDEN "Östergötlands bronsålders."

Thompson, John Eric. The solar year of the Mayas at Quirigua, Guatemala. p. 365-421. Publication 315, anthropological series, vol. 17, no. 4). Chicago, Field Museum, 1932. ISIS

Wijk, W. E. van. De Gregoriaansche Kalender. Een technisch-tijdrekenkundige studie. x + 72 p. Maastricht, 1932. ISIS

Reviewed by E. J. DIJKSTERHUIS, *Euclides* 9, 276, 1932-33.

Wilson, Philip Whitwell. The romance of the calendar. New York. NORTON, 1937. ISIS

Reviewed by MARIAN LOCKWOOD, *Natural history* 39, 371, 1937.

Yamamoto, A. S. Preliminary general catalogue of comets. *Publications of the Kwasan observatory* 1, 37 p., Kyoto, 1936. ISIS

In the 1931 issue of the *Astr. Yearbook of the Oriental Astr. Association,*

ISSEI YAMAMOTO published a general catalogue of comets. Now his son, A. S. YAMAMOTO, offers to the Western world a new, revised edition of this catalogue. The present "Preliminary general catalogue" gives only one of the best orbits for each comet, usually the definitive orbit; the author is preparing a more comprehensive "General catalogue" in which all the published orbital elements of the individual comets will be given. The catalogue lists 647 apparitions of 467 comets, between 467 B. C. and A. D. 1936; during the first two millennia, up to the end of the XVIth century, 71 apparitions of comets are recorded, mostly in China. A. P.

24. — PHYSICS

Bragg, Sir William Henry. The universe of light. x + 283 p., 181 ills. New York, MACMILLAN, 1933. ISIS

Broglie, Louis de. Voies anciennes et perspectives nouvelles en théorie de la lumière. *R. de métaphys. et de mor.* 41, 445-57, 1934. ISIS

Broglie, Louis de. Un exemple des synthèses successives de la physique : les théories de la lumière. *Thalès* 2, 9-22, 1935 (Paris, 1936). ISIS

Brunold, Charles. L'entropie, son rôle dans le développement historique de la thermodynamique. 222 p., Paris, MASSON, 1930. ISIS

Reviewed by F. M., *Revue générale des sciences* 43, 58-9, 1932.

Cerasoli, Ercole. Il problema dell'etere cosmico dalla sua origine ai tempi nostri. *Archeion* 19, 71-4, 1937. ISIS

Cittert, P. H. van. Descriptive catalogue of the collection of microscopes in charge of the Utrecht University Museum. With an introductory historical survey of the resolving power of the microscope. 110 p. illus., Groningen, NOORDHOFF, 1934. ISIS

Reviewed by M. A. VAN ANDEL, *Bijdragen tot de geschiedenis der geneeskunde* 15, 68, 1935.

Hennig, Richard. Ein Zusammenhang zwischen der Magnetberg-Fabel und der Kenntnis des Kompasses. *Arch. f. Kulturgesch.*, 20, 350-69, 1930. ISIS

Kruhm, August. Die Waage im Wandel der Zeiten. 32 p., 5 fig. Frankfurt a. M., KRAMER, 1934. ISIS

Reviewed by ZAUNICK, *Mitt. zur Gesch. d. Med.* 34, 190, 1935.

McGuigan, Hugh A. Medical thermometry. *Annals of medical history* 9, 148-54, 1937. ISIS

Mees, C. E. Kenneth. Photography. xvi + 227 p. New York, MACMILLAN, 1937 ($ 3.00). ISIS

Dr. MEES is Director of research and development at the Eastern Kodak Co., Rochester, and has for some thirty years been engaged in the development of the art and science of photography, his book may therefore be relied upon as an authoritative account of an important subject. Based on a course of lectures delivered at the Royal institution in 1935 the book provides a general survey of the whole subject of photography written in a simple and popular style. The treatment is quite comprehensive, the illustrations extremely well chosen, and the diagrams clear. The book will prove of great interest to all who are in any way concerned with reproduction by photography.
M. F. A.-M.

Nicolson, Marjorie. The microscope and English imagination. *Smith College studies in modern languages* 16, 92 p., 1935. ISIS

Repercussions of microscopy on English literature.

Papanastassiou, Ch. E. L'évolution de la théorie physique. *Thalès* 2, 228-33, 1935 (Paris 1936). ISIS

Rohr, Moritz von. Zur Entwicklung des Erdfernrohrs in der Zeit von der Farbenhebung (zwischen 1645 und 1730). *Opt. Rdsch.* 24, 723-27, 4 fig., port., 1933. ISIS

Rohr, Moritz von; Stegmann, K. Zur Entwicklung des Gestells von Brille und Augenglas. Opt. Rdsch. 24, 551-55, 576-79, 602-04, 625-30, 31 fig., 1933.

Rosenfeld, Leon. Le dualisme entre ondes et corpuscules. *Archeion* 19, 74-77, 1937. ISIS

Schreber, Karl Edmund. Die Grundlagen und Grundbegriffe der Physik der Vorgänge. Versuch einer Fortbildung der Gedanken ROBERT MAYERS. 312 p. Leipzig, NOSKE, 1933. ISIS

Stoner, Edmund Clifton. Magnetism and matter. xv + 575 p. London, METHUEN, 1934. ISIS

Reviewed by H. A. K., *Nature* 136, 88, 1935.

Zehnder, Ludwig. Der Aether im Lichte der klassischen Zeit und der Neuzeit. 76 p. Tübingen, LAUPP, 1933. ISIS

25. — CHEMISTRY, PHYSICO-CHEMISTRY, INDUSTRIAL CHEMISTRY

Ambix, The journal of the Society for the study of alchemy and early chemistry. Vol. I, May 1937, no. 1. ISIS

First number of a new journal edited by F. SHERWOOD TAYLOR and published by the Society for the study of alchemy and early chemistry. Annual subscription : one guinea, subscription to non members 24s. per volume of about 400 pages published in quarterly parts. Every number will be analyzed in the Critical bibliographies of *Isis*, which will thus include a table of contents to *Ambix*. Floreat Ambix ! G. S.

Bidez, J. Catalogue des manuscrits alchimiques. (Union académique internationale, dix-huitième session annuelle du comité, 24-27 mai 1937). Académie royale de Belgique, extrait des *Bull. de la Cl. des lettres et des sciences morales et polit.* p. 18-21, 1937. ISIS

Contents : Manuscrits grecs; manuscrits latins; manuscrits arabes; Extrême-orient.

Brunold, Ch. Les grands courants d'organisation rationnelle dans la chimie moderne. *Thalès* 2, 30-3, 1935 (Paris 1936). ISIS

Diergart, Paul. Vorschläge zu einer planmässigen Gestaltung chemiegeschichtlicher Arbeit. *Proteus* 2, 74-83, 1937. ISIS

Dumas, Jean Baptiste. Leçons de philosophie chimique. Avant-propos de GEORGES URBAIN. Coll. Les classiques de la découverte scientifique. xxviii + 270 p., ill. Paris, GAUTHIER VILLARS, 1937. ISIS

Färber, Eduard. Geschichtliche Vorbilder chemischen Arbeitens. *Proteus* 2, 65-73, 1937. ISIS

Ferchl, Fritz ; Süssenguth, A. Kurzgeschichte der Chemie mit 200 Abbildungen. Herausgegeben durch die Gesellschaft für Geschichte der Pharmazie. 217 p. Mittenwald, NEMAYER, 1936. ISIS

This is a good, brief, general history of the development of chemistry, particularly of mediaeval and of later European chemistry to the end of the nineteenth century — put together in an attractive fashion and abundantly illustrated with reproductions from old manuscripts and books, rare portraits, diagrams, and pictures of art objects. Many of the pictures have

been published before in FERCHL's "Von LIBAU bis LIEBIG : Chemikerköpfe und - Laboratorien" (cf. *Isis* 18, 501, 1933). The present book has however, in addition to its text, a much larger and better collection of pictures. It is a notable improvement over the earlier excellent publication. It is a book of the sort to arouse and stimulate in students an interest in that seemingly more romantic chemistry out of which the chemistry taught to them in their scientific courses has arisen. T. L. D.

Hägg, Gunnar. Inorganic chemistry, past and present. *Lychnos* 2, 227-35, Uppsala 1937 (in Swedish with English summary). ISIS

Sketch of the history of inorganic chemistry with special reference to the determination of the structure of molecules. G. S.

Heym, Gerard. An introduction to the bibliography of alchemy. *Ambix* 1, 48-60, 1937. ISIS

Heym, Gerard. Some alchemical picture books. *Ambix* 1, 69-75, 5 fig., 1937. ISIS

Hooykaas, R. Die Elementenlehre der iatrochemiker. *Janus* 41, 1-28, 1937. ISIS

Lippmann, Edmund O. von. Verzeichnis von Mitteln zur Reinigung, Entfärbung und Klärung zuckerhaltiger Säfte und Erzeugnisse. *Die deutsche Zuckerindustrie*, no. 2, 67-69; no. 3, 87-89; no. 4, 105-06, 125-26, 151, 1937. ISIS

Mckie, D. Some early chemical symbols. *Ambix* 1, 75-7, 1937. ISIS

Meissner, W. Walter. Chemischer Grundatlas. Ein Handbuch für den Unterricht in geschichtlicher, technischer, anorganischer und allgemeiner Chemie einschliesslich der Mineralogie auf 30 (grösstenteils vielfarbigen) Karten, nebst 15 Tabellen. xvi + 95 p., 345 fig. Leipzig, NOSKE, 1935 (RM 3.45). ISIS

Metzger, Hélène. La litterature chimique française aux 17e et 18e siècles. *Thalès* 2, 162-66, 1935 (Paris 1936). ISIS

Mond, Sir Robert. The study of alchemy. *Ambix* 1, 1-2, 1937. ISIS

Partington, J. R. The origins of the planetary symbols for the metals. *Ambix* 1, 61-4, 1937. ISIS

Pereira Salgado, José. A história da química em Portugal. III^e^ Congrès international d'histoire des sciences, Actes, conférences et communications, 11-19, Lisboa 1936. ISIS

History of chemistry in Portugal.

Pique, René. Histoire du sucre. *C. R. du VI^e^ Congrès de chimie industrielle*, 625-636, 1927. ISIS

C'est le miel qui fut d'abord utilisé comme matière sucrée. Le sucre de canne ne sera connu des Arabes que vers 622. Quant au sucre de betterave, découvert par OLIVIER DE SERRES, jardinier en chef d'HENRI IV, il n'apparaîtra qu'en 1745, après les travaux de MARGRAFF.

En se basant sur de très nombreux documents, l'auteur étudie successivement l'importance du miel en Orient, en Grèce, à Rome, puis celle du sucre de canne en Islam, en Europe et notamment en France. Vient ensuite un aperçu historique sur le sucre de betterave dont l'industrie française date de NAPOLEON I^er^. L. L.

Pique, René. Histoire de la pyrotechnie de guerre. *C. R. du IX^e^ Congrès de chimie industrielle*, 347-58, 1930. ISIS

L'emploi des pyrophores qui deviendront les feux grégeois est connu des grands-prêtres de l'Inde au II*e* siècle de notre ère. La poudre à canon est mentionnée dans les livres saints de l'ancienne religion persane, mais la formule n'est publiée qu'au IX^e^ siècle par MARCUS GRAECUS dans son *Liber ignum*. La nitrocellulose est découverte par BRACONNOT en 1832. La nitroglycérine est découver e en 1847 par l'italien ASCANIO, mais c'est NOBEL qui en 1862 en industrialise la fabrication. La mélinite (acide picrique) est découverte en 1788 par HAUSSMANN mais ne peut être utilisée qu'en 1885 après les travaux de TURPIN. Le fulminate de mercure date de 1799 (HOWARD), les poudres au chlorate de potassium de 1785 (BERTHOLLET), les poudres au nitrate de soude de 1857 (DU PONT DE NEMOURS). — Très importante bibliographie. L. L.

Renaud, Paul. Essai sur les définitions expérimentales des opérations chimiques. 40 p. (Actualités scientifiques et industrielles). Paris, HERMANN, 1936. ISIS

Ruska, Julius. Methods of research in the history of chemistry. *Ambix* 1, 21-9, 1937. ISIS

Speter, Max. A. SCHROHE und die Geschichte des Gegenstromprinzip-kühlapparates. *Zeitschrift für Spiritindustrie* 31 p. 44 2/43, 1936. ISIS

Winderlich, Rudolf. Chemie und Sprache. *Proteus* 2, 58-65, 1937. ISIS

26. — TECHNOLOGY

(For mining, see 32. *geology; for industrial chemistry,* 25 *chemistry. See also Arts and crafts under* 45*).*

Bird, Viggo E. Early beginnings of Connecticut industry 35 p., map. (The Newcomen Society, American Branch)., Princeton University Press, 1937. ISIS

Bitting, A. W. Appertizing or the art of canning; its history and development. 852 p., illus. San Francisco, Trade Pressroom, 1937. ISIS

Comprehensive, critical, and very detailed account of the important technical achievements in food preservation, written by the leading authority in the subject. Mrs. BITTING contributes a delightful introductory essay on NICOLAS APPERT (1750-1841), whose *L'Art de conserver, pendant plusieurs années, toutes les substances animales et végétales* (Paris, 1810) inaugurated practical canning methods. It is interesting that the work was promptly translated into English and that a New York edition appeared in 1812. Other classic contributions to food preservation are reprinted in the volume. C. D. L.

Bogayevski, B. L. History of technics. Vol. I, part I. The technics of the primitive communistic society. xii + 635 p., 361 fig., 10 maps. *Transactions of the Institute for the history of science and technology*, series 4, issue 1, Moscow, Academy of Sciences Press 1936 (in Russian). ISIS

Reviewed by A. P., *Isis* 26, 486-87, 1937.

Curwen, E. Cecil. Querns. *Antiquity* 11, 133-51, 4 pl., 4 fig., 1937. ISIS

History of querns or hand-mills in early England. G. S.

ffoulkes, Charles. The gun-founders of England. With a list of English and continental gun-founders from the XIV to the XIX centuries. Preface by Lord COTTESLOE. xvi + 134 p., 15 pl., 38 ills. Cambridge University Press, 1937. ISIS

Lefebvre des Noettes, Ct. De la marine antique à la marine moderne.

La révolution du gouvernail. Contribution à l'histoire de l'esclavage. Paris, MASSON, 1935. ISIS

Reviewed by DANA B. DURAND, *Isis* 26, 484-86, 1937.

Martin, Alfred. Auswahl und Bedeutung der Steine zum Erhitzen des Wasser- und des Dampfbades. *Proteus* 2, 162-65, 1937. ISIS

Meldau, Robert. Der Gütegedanke im Zeichenrecht des Deutschen Reichs um 1600. Nach den Quellen bearbeitet. *Proteus* 2, 180-88, 1937. ISIS

Odqvist, Folke K. G. The connections between science and engineering. *Lychnos* 2, 148-60, Uppsala 1937 (in Swedish with English summary). ISIS

"Generally speaking, the interrelations between science and engineering constitute a mutual exchange of ideas and working methods, whereby the engineer takes up and utilizes a scientific discovery and, at the same time perhaps, increases the possibilities for the scientist to penetrate the secrets of nature. This thesis, earlier brilliantly stated by C. G. DARWIN in relation to the modern development of electronics and electrical engineering, is here applied to the strength of materials. A series of special examples are worked out in detail in the light of history indicating a similar development."

Weihe, Carl. Geschichte und Kultur der Technik. *Proteus* 2, 166-72. 1937. ISIS

IV. BIOLOGICAL SCIENCES

(knowledge of organic nature)

27. — BIOLOGY

(*generalities, "Natural history"*)

Bacq, Z. Hormones et vitamines. Un aspect du problème des quantités infinitésimales en biologie. 30 p., ill. Paris, HERMANN, 1934. ISIS

Conn, H. J. Biological stains. A handbook on the nature and uses of the dyes employed in the biological laboratory. Ed. 3, 276 p., 5 fig. Geneva, N. Y., Commission on standardization of biological stains, 1936 ($3.00). ISIS

This third edition adds 23 new stains to the 90 included in the second edition and a number of new staining procedures. All such additions have been tested by members of the Commission on biological stains, founded in 1922 with the coöperation of the National Research Council, but now an independent organization, with representatives from eight national American biological societies. It publishes a quarterly, *Stain technology*, gives chemical, spectrophotometric, and biological tests to batches of stains as they are made up by manufactures and certifies as to their standardization. To date, 48 stains, submitted by six American manufactures, carry the certification label of the Commission. C. A. K.

Dantchakoff, Véra. Le devenir du sexe. 60 p., ill. Paris, HERMANN, 1933. ISIS

Ce mémoire s'ouvre par un court résumé, avec bibliographie, des travaux faits depuis 1911 sur la morphogenèse du sexe.

Dantchakoff, Véra. Déterminisme et réalisation dans le devenir du sexe. 78 p., ill. Paris, HERMANN, 1935. ISIS

Gause, G. F. Vérifications expérimentales de la théorie mathématique de la lutte pour la vie. 64 p., ill. Paris, HERMANN, 1935. ISIS

Huxley, Julian S. Eugenics and society. *Eugenics review* 28, 11-31, 1936. ISIS

Klein, Marc. Histoire des origines de la théorie cellulaire. 72 p. (*Actualités scientifiques et industrielles*, 328, Exposés d'histoire et philosophie des sciences, 3). Paris, HERMANN, 1936. ISIS

1. La découverte de la cellule et les débuts de l'anatomie microscopique végétale; 2. Les théories sur la structure élémentaire des êtres vivants au cours du XVIII^e^ siècle; 3. Genèse de la théorie cellulaire au cours de la première moitié du XIX^e^ siècle; La philosophie de la nature, L'anatomie microscopique végétale, Recherches sur la structure des corps animaux depuis BICHAT jusqu'à la publication du livre de SCHWANN, Aperçu sur le développement de la théorie cellulaire, de SCHWANN à MAX SCHULTZE.

L'héritier, Ph. Génétique et évolution. Analyse de quelques études mathématiques sur la sélection naturelle. 44 p. Paris, HERMANN, 1934. ISIS

Lillie, Ralph S. Directive action and life. *Philosophy of science* 4, 202-26, 1937. ISIS

Machin, Alfred. DARWIN's theory applied to mankind. With a fore-

word by Sir ARTHUR KEITH. xxiv + 284 p. London, LONGMANS, 1937. ISIS

"This work has its origin in the conviction that DARWIN's theory must apply to mankind, and is an attempt to work out its mode of operation. The hunting races of the world are considered to represent the intermediate state of mankind. It is seen that they have a set of instincts and a code of morality. The Author contends that the instincts must represent the original state of mankind and clearly indicate that this state was not social. The moral code is then seen to constitute the survival values of the succeeding social stage. It is inferred that speech, intelligence and self-consciousness developed *pari passu* with this morality. The morality of civilization, as expressed in the great religions, represents the survival values of civil life in the new conditions; modern man emerges simply as a bundle of survival values, deriving from the different states through which mankind has passed and is passing."

Meyer, Adolf. Wer soll Geschichte der Biologie schreiben? *Archiv für Geschichte der Medizin* 29, 357-62, 1937. ISIS

Nicolle, Charles. La nature. Conception et morale biologiques. 134 p. Paris, ALCAN, 1935. ISIS

Noüy, P. Lecomte du. Biological time. With foreword by ALEXIS CARREL. xiv + 150 p. New York, MACMILLAN, 1937 ($ 2.00). ISIS

A detailed elaboration of the author's well known work. If the author's equations are frequently made to bear loads which they are incapable of supporting, the text is, at any rate, original enough to be rich in fruitful suggestion to those interested in the general problems of growth. M.F.A-M.

Peattie, Donald Culross. Green laurels. The lives and achievements of the great naturalists. xxiii + 368 p., 30 pl., 5 fig. New York, SIMON and SCHUSTER, 1936. ISIS

Reviewed by C. A. KOFOID, *Isis* 27, 95, 1937.

Porto, César. Transformisme et hérédité. Les organismes et le milieu terrestre. 328 p., ill. BERTRAND, Lisbonne, 1935. ISIS

L'auteur explique l'hérédité et ses anomalies par les qualités magnéto-électriques de l'écliptique suivant lequel sont rangés les chromosomes qui peuvent inscrire les vibrations planétaires ou solaires se mélant à celles du zodiaque pour les déformer un peu (?). L. G.

Rusconi, Carlos. Fauna y flora de las arenas puelchenses de Bueno

Aires. III^e congrès international d'histoire des sciences, Actes, conférences et communications, 194-99, Lisbon 1936. ISIS

Russell, F. S.; Yonge, C. M. The seas. Our knowledge of life in the sea and how it is gained. With 384 illustrations, 167 of which are in full colour. Revised edition. xiii + 379 p. London, WARNE, 1936 ($ 5). ISIS

The first edition appeared in 1928. This revised edition is a splendid textbook, elementary, but very intelligently made and comprehensive. I have read the greatest part of it, and read it with great pleasure. It is clearly and gently written, without purple patches but without dull ones. The illustrations are abundant and well chosen, but not always well placed. Though the main purpose is biological, chemical and physical subjects are discussed adequately. The absence of an index of personal names is regrettable, chiefly for historians of science. Contents : 1. General introduction; 2. The sea shore; 3. The sea bottom; 4. Swimming animals; 5. Drifting life; 6. Boring life; 6. Coral reefs; 8. Colour and phosphorescence; 9. Feeding of marine animals; 10. Sea water; 11. Ocean seasons; 12. Methods of oceanographical research; 13. The sea fisheries; 14. The shellfish industry; 15. Fishery research; 16. Products from sea. G. S.

Schierbeek, A. De organische eenheid (Eenheid en opgang). 36 p. Zeist, J. PLOEGSMA (no date, received in May 1937). ISIS

A discussion of organic unity, a part of the collection entitled *Unity and progress*, published by PLOEGSMA in Zeist, Netherlands. G. S.

28. — BOTANY

(Agronomy, Phytopathology, Palaeobotany)

Arber, Agnes. The interpretation of the flower : a study of some aspects of morphological thought. *Biological review* 12, 157-84, 1937. ISIS

Barnhart, John Hendley. Some fictitious botanists. *Journal of the New York botanical garden* 20, 171-81, 1919. ISIS

Apropos of 14 biographies of botanists, included in APPLETON's *Cyclopedia of American biography* (1887-89), which are entirely fictitious ! See M. C. SCHINDLER in *American historical review* (vol. 42, 680-90, 1937). G. S.

Boisacq, Émile. La poire et le poirier dans l'antiquité et au moyen-âge. Dans *Études horatiennes* publiées à l'occasion du bi-millénaire de la naissance du poète latin. Fascicule VII des *Travaux de la Faculté de philosophie et lettres de l'Université de Bruxelles*, 1937. ISIS

Dantchakoff, Véra. La cellule germinale dans le dynanisme de l'ontogenèse. Préf. de MAURICE CAULLERY. 88 p., ill. Paris, HERMANN, 1934. ISIS

Günther, Ursula. Zur Geschichte der Gewürznelke bis zum Ende des Mittelalters. Inaugural-Dissertation. *Institut für Geschichte der Medizin zu Leipzig* 27 p. Leipzig, ARNOLD, 1937. ISIS

History of cloves and their uses down to 1500, with a very brief summary of their history after 1500. G. S.

Hunger, F. W. T. The herbal of pseudo-APULEIUS, from the ninth-century ms. in the abbey of Monte Cassino (Codex Casinensis 97) together with the first printed edition of JOH. PHIL. DE LIGNAMINE (Editio princeps Romae 1481) both in facsimile described and annotated. With two portraits. Large folio (43 × 56 cm.), xlviii + 168 p., 120 facs. Leyden, BRILL, 1935. ISIS

Reviewed by A. C. K., *Isis* 27, 96-8, 1937.

Junk, W. Botanica generalis. No. 92, 67 p., 1483 items Den Haag, Scheveningsche Weg 74, 1937. ISIS

Souèges, René. L'embryologie végétale. Résumé historique. I^ere époque : des origines à HANSTEIN (1870). 58 p. Paris, HERMANN, 1935. ISIS

Zirkle, Conway. The plant vacuole. *Botanical review* 3, 1-30, 1937. ISIS

"SPALLANZANI described contractile vacuoles in animals as early as 1776. MEYER (1835) depicted the large central vacuole characteristic of the mature plant cell in his illustration of cytoplasmic streaming and SCHLEIDEN (1842) recorded the difference between the vacuolar contents and the cytoplasm itself. CHARLES DARWIN (1875) first noted the fragmentation of the colored vacuoles which accompanied the movement of the tentacles of *Drosera*, and DEVRIES (1877) called attention to the importance of vacuoles in the investigation of osmosis. WENT (1888) reached the general conclusion that all plant cells contained vacuoles and HOF (1898) showed that even meristematic cells were vacuolate. Today vacuoles are of interest to biologists chiefly because of their importance in the study of permeability."

29. — ZOOLOGY

Gudger, E. W. Beginnings of fish teratology, 1555-1642. BELON, RONDELET, GESNER and ALDROVANDI, the fathers of ichthyology,

the first to figure abnormal fishes. *Scientific monthly* 43, 252-61, 10 p., 8 fig., 1936. ISIS

Gudger, E. W. Fooling the fishes. Fishing with the bateau and the white varnished board in China and with similar devices in other parts of the world. *Scientific monthly* 44, 295-306, 1937. ISIS

Oudemans, A. C. Kritisch historisch overzicht der acarologie. Derde gedeelte, 1805-1850, Band B : Ixodides LEACH 1815, xi + p. 431-793, 170 fig., 1936 ; Band C : Tarsonemini CAN. & FANZ. 1877, Stomatostigmata OUDMS. 1906, Eleutherengona OUDMS. 1909, xxiii + p. 799-1348, 230 fig., 1937. Leiden, BRILL. ISIS

This great work was reviewed at the time of publication of the first two volumes (1926-29; *Isis* 15, 381-86). It will suffice at present to announce the continuation of the third part dealing with the development of acarology in the first half of the nineteenth century. May the author live to complete that magnum opus. G. S.

Pincus, Gregory. The eggs of mammals. 160 p., 33 fig. New York. MACMILLAN, 1936 ($ 3.75). ISIS

This is the third volume in the Experimental biology series under the editorship of fourteen American experimental biologists. It affords an excellent summary of up-to-date knowledge of the origin, growth, and development of normal ova of mammals, the atresia of fullgrown ova, ovarian parthenogenesis, experimental manipulations of mammalian ova, the tubal history of unfertilized eggs, normal fertilization and cleavage, the activation of unfertilized eggs, and the growth and implantation of the blastodermic vesicle in the uterus. There is also an extensive bibliography.

The historical introduction to the subject is comprehensive and adequate and that of each of the chapters is likewise carefully developed in relation to development of the topics in hand. The book is thus most admirably documented.

VON BAER (1827) discovered the mammelian egg; BARRY (1839) discovered its cytoplasmic cleavage; STOCKARD and PAPANICOLOU (1917) and LONG and EVANS (1922) worked out the oestrous cycle in the guinea pig and rat, respectively; BRACHET (1912, 1913) applied the tissue culture technique to the growth of rabbit ova *in vitro*; LEWIS and GREGORY (1929) published their account of the cinematography of rabbit ova developing in culture; and NICHOLAS (1933) and his coworkers have contributed to our knowledge of the physiology of developing ova. C. A. K.

Ransome, Hilda M. The sacred bee in ancient times and folklore. 308 p., 12 pl., 35 fig. London, ALLEN & UNWIN, 1937. ISIS

Contents : 1. Early times; 2. Ancient Egypt; 3. Sumeria, Babylonia, and Assyria, 4. India and China; 5. The Hittites, Western Asia, and Crete;

6. The Hebrews and Mohammedans; 7. Beekeeping in Greece; 8. Beekeeping among the Romans; 9. Bees and honey in Greek and Roman myths; 10. The "Ox-born bee"; 11. Honey in Greek religious rites; 12. The food of the Gods; 13-14. Bees and honey among the Germanic and Slavonic peoples; 15. Bee folklore in Finland, The Kalevala; 16-17. Beekeeping in the British Isles; 18. Customs and superstitions in France; 19. Folk-stories from various lands; 20. The bee in America; 21. Ritual uses of milk and honey; 22. Primitive peoples of to-day. Index.

V. SCIENCES OF THE EARTH

(implying knowledge of both organic and inorganic nature)

30. — GEODESY

Perrier, Général. Historique sommaire de la géodésie. *Thalès* 2, 117-29, 1935 (Paris 1936). ISIS

31. — GEOGRAPHY AND OCEANOGRAPHY

Fontoura da Costa. La science nautique des Portugais à l'époque des découvertes. III^e^ Congrès international d'histoire des sciences, Actes, conférences et communications, 68-92, Lisbon, 1936. ISIS

See my review of the Actes du III^e^ congrès intern. d'hist. des sciences in *Isis* 28, 135-8. G. S.

Hodgson, H. B. Notes on the history of the teaching of geography. *Geography* 22, 44-8, 1937. ISIS

Place of geography in European education in medieval and modern times. C. W. A.

Jaguaribe de Mattos, F. Les idées sur la physiographie sud-américaine. *III^e^ congrès international d'histoire des sciences, actes, conférences et communications*, 391-440, Lisbon, 1936. ISIS

1. Aperçus historiques et critiques de CHRISTOPHE COLOMB au général RONDON, Evolution des connaissances cartographiques relatives à l'Amérique du Sud et spécialement au Brésil; 2. Aperçus géognostiques et physiographiques, Aspects nouveaux de la physiographie de l'Amérique du Sud et spécialement du Brésil; Tableau général des communications existantes entre les bassins fluviaux de l'Amérique du Sud. Etude fort intéressante illustrée à l'aide de fort belles cartes. Voir les informations biographiques données dans mon compte rendu des Actes du III^e^ Congrès international d'Histoire des sciences (*Isis* 28, 135-8). G. S.

Kerp, Heinrich. Auf der Suche nach einem philosophischen Einheitsbegriff der Erdkunde. *Proteus* 2, 104-12, 1937. ISIS

Platt, Elizabeth T. Madagascar : great isle, red isle. A bibliographical survey. *Geographical review* 27, 301-08, 1 fig., 1937. ISIS

Raisz, Erwin. Outline of the history of American cartography. *Isis* 26, 373-91, 2 charts, 5 fig., 1937. ISIS

Contents : 1. Colonial cartography (1670-1780); 2. Emancipation of American cartography (1780-1820); 3. The Golden Age of American cartography (1820-1840); 4. Lithography and wax engraving (1804-1860); 5. County atlases (1860-1900); 6. The age of the great surveys (1870-1900); 7. Modern maps (1900-1930); 8. Airplane photography (1930-); Bibliography.

Ramos da Costa, Augusto. Alguns dados para a história da oceanografia em Portugal. III[e] congrès international d'histoire des sciences, Actes, conférences et communications, 440-46, Lisbon 1936. ISIS

History of oceanography in Portugal. G. S.

Stamp, Sir Josiah. Geography and economic theory. *Geography* 22, 1-14, 1937. ISIS

A review of opinions on extent of common content of the two subjects. C. W. A.

Sviatlovsky, E. E.; Eells, Walter Crosby. The centrographical method and regional analysis. *Geographical review* 27, 240-54, 8 fig., 1937. ISIS

With historical résumé.

32. — GEOLOGY, MINERALOGY, PALAEONTOLOGY, MINING.

(For palaeobotany, palaeozoology and palaeoanthropology, see respectively 28. *botany,* 29. *zoology, and* 39. *prehistory)*

Brauns, Reinhard. Die geologisch-mineralogische Durchforschung des Laacher Seegebietes in ihrer geschichtlichen Entwicklung dargestellt. *Proteus* 2, 83-92, 1937. ISIS

Davison, Charles. Great earthquakes. xii + 286 p. London, MURBY, 1936. ISIS

Reviewed by P. LAKE, *Geographical journal* 89, 284-85, 1937. "A summary account of eighteen earthquakes between 1755 and 1931."

Forbes, R. J. Sketch of the history of the petroleum industry. II[e] congrès mondial du pétrole, Paris juin 1937, 6 p. ISIS

Lockart, Laurence. Persian petroleum in ancient and medieval times. II[e] congrès mondial du petrole, Paris juin 1937, 9 p., map. ISIS

Mercier, Maurice. Quelques points de l'histoire du pétrole. Vérifications par le laboratoire. Association françaises des techniciens du pétrole, p. 121-42, 1937. ISIS

Mikucki, Tadeusz. L'histoire de l'industrie polonaise du pétrole. II[e] congrès mondial du pétrole, 5 p., 1937. ISIS

Nowacki, Werner. Cinquante ans de théorie générale de la structure des cristaux. *Annales Guébhard-Séverine* 12, 120-39, 25 fig., 1936. ISIS

Vernadski, Vladimir Ivanovich (b. 1863). Outlines of geochemistry. 4th (2nd Russian) edition. 380 + 2 p. Leningrad, 1934. (6.50 rbls.; binding, 1 rbl.). ISIS

The 1st ed. (in French) of this work appeared under the title La géochimie, Paris, F. ALCAN, 1924. It was based on the lectures delivered by VERNADSKI at the Sorbonne, in 1923-24, and stressed the problems of geochemistry to the solution of which the author had made contributions in his previous publications and studies. — The 2nd ed. (1st Russian ed.), Outlines of geochemistry, Leningrad, 1927, was an enlarged and partially revised translation of the French edition. — The 3rd ed. (in German), Geochemie in ausgewählten Kapiteln, Leipzig, Akad. Verlagsges., 1930, translated by ERNST KORDES, was based on the Russian edition of 1927, and was considerably revised. — The 4th ed. (2nd Russian ed.), Outlines of geochemistry, Leningrad 1934, is based on the German edition of 1930, but differs from it by revisions and additions. — The 5th ed. (in Japanese) was published in 1934.

"The XXth century is witnessing the development of this new kind of sciences — sciences dealing with the individual atoms, — atomic physics, radiology, radiochemistry, and the latest addition, geochemistry, a part of astrophysics. Geochemistry is a scientific study of the chemical elements, i.e., of the atoms, of the crust of the earth, and, as far as possible, of the planet as a whole. Geochemistry studies their history, their distribution, and their movement in space-time, their genetic relationships on our planet. Geochemistry differs sharply from mineralogy, because the latter is, in the same space-time of the history of the earth, a study of the history of combinations of atoms — of molecules and of crystals." (4th ed., p. 9). The following quotation from E. KORDES's preface to the German edition of 1930 is of interest to the historian of science. "In seinem Buch der "Geo-

chemie" tritt der Verfasser W. J. VERNADSKY zum Teil von einer ganz anderen Seite an die Probleme der Geochemie heran, als wir es von diesen Arbeiten anderer Forscher, z.B. V. M. GOLDSCHMIDT, F. CLARKE, H. WASHINGTON — um nur einige wenige Namen herauszugreifen — gewohnt sind. Hier herrscht die "anorganische" Richtung unter Zuhilfenahme von physikalischer Chemie und Physik vor. VERNADSKY zeigt uns dagegen, dass auch noch weitere wesentliche Erscheinungen mitzuberücksichtigen sind, besonders die Lebensvorgänge in der Biosphäre, will man den gesamten Mechanismus der äusseren Zonen unseres Planeten — der Erdrinde — verstehen. Die von ihm hierbei ausgewählten Kapitel dürften somit dem Leser vieles bieten, was er in anderen zusammenfassenden Werken über Geochemie im allgemeinen nicht findet." — The historical outline (4th ed., p. 7-22) covers the development of geochemistry, from its beginnings in the XVIIth century. The historian of science will find, throughout the book, data on scientific discoveries and sketches of the development of ideas. — The number of notes — practically all of them contain bibliographical references, even if their primary purpose happens to be exegetic, — has increased from 834 in the 3rd ed. to 1100 in the 4th ed. The Russian and the "Latin" subject and name indexes were carefully compiled, and these four indexes analyze both the text and the notes. A. P.

Vernadski, W. Les problèmes de la radiogéologie (Exposés de géologie publiée sous la direction de L. CAYEUX, 1). 68 p. Paris, HERMANN, 1935. ISIS

Texte de deux conférences de radiogéologie faites à l'Université de Paris en décembre 1933.

33. — METEOROLOGY, CLIMATOLOGY, AND TERRESTRIAL PHYSICS

Dedebant, G.; Wehrlé, Ph. La mécanique de l'atmosphère et des grands milieux fluides fondée sur les concepts d'échelle et de probabilité. *Thalès* 2, 53-81, 1935. (Paris, 1936). ISIS

Douglass, Andrew Ellicott. Climatic cycles and tree growth. Volume III : A study of cycles. x + 171 p., 24 pl., 58 fig. Washington, D. C., Carnegie Institution of Washington, 1936. ISIS

The astronomer DOUGLASS' studies of tree rings for chronological purposes began to appear twenty years ago (vol. 1, 1919; vol. 2, 1928). He seems to have made a good case for the possibility of establishing sequences of tree rings extending back to the second century, which may enable one to date individual logs found in buildings of a given region. The present volume is devoted to the harmonic analysis of these sequences and their application to the study of climatic cycles. As the author remarks (p. 4) : "It is well recognized that development of long-range forecasting is highly desirable.

This is true in any part of the country, but it is especially true in marginal lands that are subject to strong climatic variations from year to year — variations whose violence and time of coming are of the highest importance, because man's very existence in such places depends upon his power of adaptation to such changes. Changes of this sort become very graphic in the area under consideration. For example, Mormon Lake, the largest in Arizona, four by six miles in extent, was totaily dry in 1901 when crossed by the writer. Now its shores have been a summer resort since 1909 and the lake is advertised for its fishing. What made it go dry, and how can we determine when it will go dry again? In the spring of 1935 the desert was covered with wildflowers, while in 1934 it was not. That is due to great difference in winter precipitation in the two years. What made that difference?" The bibliography (p. 166-71) reveals the remarkable growth of that new unnamed science (shall we call it "natural chronology"?) within the last twenty years. DOUGLASS' own contributions are among the most original and fruitful. Praise to the Carnegie Institution for the encouragement it has given him. It is about time to write a manual of Natural chronology.

G. S.

Kostitzin, V. A. Évolution de l'atmosphère. Circulation organique. Époques glaciaires. 46 p., ill. Paris, HERMANN, 1935. ISIS

VI. ANTHROPOLOGICAL AND HISTORICAL SCIENCES
(Knowledge of man, past and present)

34. — ANATOMY

Ashley-Montagu, M. F. The premaxilla in man. *Journal of the American dental association* 23, 2043-57, 9 fig., 1936. ISIS

Very elaborate account including a historical survey wherein all the sources are referred to. This is one of the most interesting chapters in the history of anatomy.

G. S.

Needham, Joseph. A history of embryology. xviii + 274 p., 16 pl., 40 fig. Cambridge, University Press, 1934. ISIS

Reviewed by C. A. KOFOID, *Isis* 27, 98-102, 1937.

35. — PHYSICAL ANTHROPOLOGY
(*Anthropometry and races of man*)

Adams, Romanzo. Interracial marriage in Hawaii. xvii + 353 p. New York, MACMILLAN, 1937 ($ 4.00). ISIS

An important and ably executed study of interracial marriage and race relations in an area of unusual interest, presenting conditions of an almost

experimental character. A work of the very widest significance for students of social groups and of race problems. M. F. A-M.

Jenks, Albert Ernest. Pleistocene man in Minnesota. xiii + 197 p. Minneapolis, University of Minnesota Press, 1936 ($7.50). ISIS

On the morning of June 16, 1931 the skeleton here described was discovered by workmen operating on a roadway some three miles north of Pelican Rapids in Otter Tail County, Minnesota. The circumstances of the find, the geological conditions of the region in which the skeleton was found, the particular stratigraphical conditions in which the skeleton was found, and the morphological characters of the skeleton are painstakingly discussed by the author. The skeleton is apparently that of a fourteen or fifteen year old female. This is not the place for a detailed discussion of Professor JENKS arguments. It should here, however, be said, that admirable as Professor JENKS' exposition is we feel that he has rather spoilt his case for the antiquity of Minnesota man, for which he claims an age of at least 20,000 years, by his over-anxiousness to prove the primitiveness of certain morphological features of this skeleton. It is by no means necessary to prove morphological primitiveness in order to prove temporal antiquity. However this may be, there is not a single character of Minnesota man which could not be duplicated in the skeleton of any small sample of Siouan Indians. Geologically, the evidence adduced is not altogether satisfactory. We should like to see a number of geological opinions before accepting the pleistocene attribution. What we are chiefly interested in here in America, as elsewhere, is the historical analysis of man and his culture, attempts to thrust his appearance upon this continent back into remote antiquity are at present quite unjustified by the available evidence. In giving Minnesota Man an age of 20,000 years we do not believe that Professor JENKS' is operating outside the range of man's actual appearance on this continent, but what we are strongly inclined to believe is that upon the basis of the evidence provided in his monograph there does not seem to be sufficient justification for assigning so great an antiquity to this particular skeleton.

The book is excellently produced and is bound to do American anthropology a great deal of good. M. F. A-M.

36. — PHYSIOLOGY

(*human and comparative*)

Baldwin, Ernest. An introduction to comparative biochemistry. xviii + 112 p. New York, MACMILLAN, 1937 (1.50). ISIS

Comparative biochemistry is a relatively new science and this book is the first introduction to the subject in the English language. The study of the physiochemical processes associated with the manifestations of what we call life must draw upon a wide range of data which, as the author points out, lies scattered throughout almost the entire field of biological literature. Dr. BALDWIN has very ably contrived to get a good deal of the essence of these widely diffused contributions into his book, which not only constitutes an excellent introduction to the subject, but also provides a prophetic view

of the great contributions which comparative biochemistry must eventually make towards the solution of such problems as the geneticist, the physiologist, the morphologist, and, indeed, every biologist is concerned. The book ought to be in the hands of every student of biology. There is a good selected list of references and an index. M. F. A-M.

Erlanger, J.; Gasser, Herbert S. Electrical signs of nervous activity. x + 221 p. Philadelphia, University of Pennsylvania Press, 1937 ($ 3.50). ISIS

This series of five lectures which was delivered on The Eldridge Reeves Johnson Foundation for medical physics in 1936 constitutes an original and important contribution to our knowledge of the physiology of the nervous system. The first three lectures were delivered by Professor ERLANGER, and the final two lectures by Professor GASSER. The lectures assume no very profound knowledge either of electrical physics or the structure of the nervous system, hence they may be read with profit by the beginning student as well as by the specialist. The lectures deal with (1), The analysis of the compound action potential of nerve, (2), the comparative physiological characteristics of nerve fibers, (3), some reactions of nerve fibres to electrical stimulation, (4), sequence of potential changes, and (5), the excitability cycle.

Professors ERLANGER and GASSER do not, as they themselves point out in their preface, always agree in their interpretations, — this, if anything, lends heightened interest to their pioneering work in a difficult field, and may perhaps inspire others to embark upon a voyage calculated to reconcile their friendly differences.

There is a good list of references, the work is excellently illustrated and produced, and there is a good index. M, F. A-M.

Hofsten, Nils von. L'air vital. Contribution à l'histoire de la théorie antique du pneuma. *Lychnos* 2, 341-85, Uppsala 1937 (in Swedish with French summary). ISIS

Holmes, Eric. The metabolism of living tissues. With a foreword by F. GOWLAND HOPKINS. xi + 235 p. Cambridge, University Press, 1936 (7/6; $ 2.25). ISIS

A most excellent survey of the present range of knowledge in dynamic biochemistry rather originally treated with the emphasis placed on the biological aspects of the subject rather than on the purely chemical.

M. F. A-M.

Izquierdo, Jose Joaquin. Balance cuatricentenario de la fisiologia en Mexico. vi + 358 p. Ediciones Ciencia, Mexico, 1934. ISIS

This is a finely printed and well illustrated account of physiology and medicine in Mexico from the time of the Spanish conquest. It was written in connection with the centennial celebration of the Faculty of Medicine

established in the University of Mexico in 1833. This succeeded the Medical Faculty founded in 1580 in the Royal University of Mexico, the first on the American continent (1553). With justifiable pride the author describes the great medical classics in the Biblioteca Nacional. The first professor of physiology on the New Faculty set up in 1833 was Don MANUEL CARPIO (1791-1860), who introduced MÜLLER, MAGENDIE and BERNARD to Mexico. He was succeeded by a group whose later members have been active and scholarly contributors, including FERNANDO OCARANZA, ARTURO ROSENBLUETH, and the author. The first book dealing with physiology to be published on the American continent was written by MARCOS JOSÉ SALGADO (1671-1740), who was Professor of anatomy and surgery at the Royal University of Mexico. The book was published in Mexico in 1727 and had the title *Cursus medicus Mexicanus / Iuxta sanguinis circulationem, & alia / Recentiorum Inventa / ad usum Studentium in hac Regali, / Pontificia, Mexicana Academia / ... Pars Prima Physiologica.* There is a good index to Prof. IZQUIERDO's volume, and valuable bibliographies relating to the work of the Mexican physiologists. C. D. L.

Lusk, Graham (1866-1932). Nutrition. xii + 142 p., 13 ill. (Clio medica). New York, HOEBER, 1933. ISIS

Histoire de la physiologie de la nutrition.

37. — PSYCHOLOGY

(*human and comparative*)

Anastasi, Anne. Differential psychology. xvii + 615 p. New York, MACMILLAN, 1937 ($ 2.50). ISIS

This book is unquestionably the best introduction to differential psychology in the English language. Here for the first time the scattered work of numerous investigators is brought together and presented in a clear and interesting manner. Each chapter is followed by a full list of references, and the discussions are sound and reliable. There is a good historical introduction. The book is eminently fitted for University classes and is assured of a long and useful career. At the same time it also makes excellent continuous reading in a field at once important and of ever-increasing importance. There is only one omission which we regard as serious, and that is, the absence of any reference to MARJORIE FLEMING in the chapter on Genius. American students would delight in knowing of this remarkable child. There are good indices, and the price of the book is remarkably low both for the quality and the quantity one receives. M. F. A-M.

Blanché, Robert. La notion de fait psychique. Essai sur les rapports du physique et du moral. 404 p. Paris, ALCAN, 1935. ISIS

Brunschvicg, Leon. Les âges de l'intelligence. 152 p. Nouvelle encyclopédie philosophique. Paris, ALCAN, 1934. ISIS

Delacroix, Henri. Les grandes formes de la vie mentale. 190 p. (Nouvelle encyclopédie philosophique). Paris, ALCAN, 1934. ISIS

Gurwitsch, Aron. Développement historique de la Gestaltpsychologie. *Thales* 2, 167-76, 1935 (Paris 1936). ISIS

Myers, C. S. In the realm of mind. 251 p. New York, MACMILLAN, 1937 ($2.50). ISIS

A series of addresses on a variety of subjects from the psychological viewpoint, embracing : The help of psychology in the choice of a career — The human factor in accidents — The psychology of musical appreciation — A psychological regard of medical education — The modern development of social psychology — Towards internationalism — Psychological conceptions in other sciences — The absurdity of any Mind-Body relation — The nature of Mind. M. F. A-M.

Quercy, Pierre. Les hallucinations. 164 p. (Nouvelle encyclopédie philosophique). Paris, ALCAN, 1936. ISIS

Sartre, Jean Paul. L'imagination. 164 p. (Nouvelle encyclopédie philosophique). Paris, ALCAN, 1936. ISIS

Wallon, Henri. Les origines du caractère chez l'enfant. Les préludes du sentiment de personnalité. x + 268 p. Paris, BOIVIN, 1934. ISIS

38. — ARCHAEOLOGY

(Generalities, methods)

History of archaeology and erudition

Kendrick, Thomas Downing ; Hawkes, C. F. C. Archaeology in England and Wales, 1914-1931. xix + 379 p. London, METHUEN, 1932 (18 s.). ISIS

A very lively and valuable review of archaeological discoveries and studies in England from 1914 to 1931 by the Assistant Keepers of British Antiquities in the British Museum. It is of interest here to note that the senior author, who was at one time "utterly contemptuous" of eoliths, is now convinced that some of them at least were made by human hands, hence he is now quite willing to accept the possibility, the probability even, of Pliocene man in England. The materials dealt with are examined in their natural order as from Pre-Palaeolithic Man to Roman Britain. The work is very well illustrated, there is a good select bibliography and an index. M. F. A-M.

39. — PREHISTORY

Ashley-Montagu, M. F. Cannibalism and primitive man. *Science* 86, 56-7, 1937. ISIS

Baudoin, Marcel. La topographie des organes sexuels extérieurs féminins. *Presse médicale*, 1907-08, 21 nov., 1936. ISIS

Existe-t-il en préhistoire des documents matériels qu'on puisse considérer comme des représentations réelles des organes sexuels féminins du genre humain ?

L'A. répond d'une manière affirmative, en se basant sur l'observation d'objets en silex, en roches dures, en os et en ivoire de l'époque paléolithique.

L. L.

Casteret, Norbert. Dix ans sous terre. Campagnes d'un explorateur solitaire. Ouvrage couronné par l'Académie française. xxi + 314 p. Paris, PERRIN, 1937 (18 fr.). ISIS

Étude très attachante. E. A. MARTEL a écrit une bonne préface dont je cite le début : "NORBERT CASTERET s'est fait connaître en 1923 par un coup de maître : la découverte des dessins et des statues préhistoriques de la caverne de Montespan (Haute-Garonne); depuis, il en a révélé bien d'autres du même genre. C'est donc dans le domaine, si étrange, de la Préhistoire qu'il a fait ses premières armes et remporté ses succès préliminaires, relatés au présent ouvrage. Mais, à Montespan, il obtenait son étonnante trouvaille par un trait d'audace inouï : plonger dans les ténèbres d'une rivière souterraine, sous une voûte immergée, dans un siphon de profondeur et longueur inconnues. Comme, au premier essai, il ne s'y est ni noyé, ni cassé la tête, l'aventure l'a mis en goût : ce périlleux exercice constitue maintenant pour lui une méthode professionnelle. Elle l'éleva rapidement vers les plus ardus problèmes scientifiques et les applications pratiques de l'hydrogéologie souterraine : c'est-à-dire aux énigmes et mystères qui enveloppent encore les abîmes, les cavernes, leurs réservoirs de sources, etc. Depuis plus de dix ans, il s'applique à découvrir et explorer les rivières souterraines qui, comme le Mas d'Azil (Ariège), transpercent les avant-monts pyrénéens (chaînons du Plantaurel, des Petites Pyrénées, etc.). Elles existent en bien plus grand nombre qu'on ne le soupçonnait il y a vingt-cinq ans. Et leur connaissance importe grandement tant à l'hygiène publique (à cause de leur relation avec des abîmes continuant à servir de dépotoirs), qu'aux applications de la houille blanche. Chaque année NORBERT CASTERET allonge la liste de ces curieuses manifestations, dont trois ou quatre seulement étaient connues au début de ce siècle; leur étonnante multiplication finit par acquérir le caractère d'une loi générale, qui ne tardera pas à retenir toute l'attention des géologes".

G. S.

O'Rahilly, Thomas F. The Goidels and their predecessors. (The

Sir John Rhys memorial lecture). *Proceedings of the British Academy*, vol. 21, 323-72, 1935. ISIS

"The coming of the Celts to Ireland is a subject upon which many diverse views have been propounded. Historians of early Ireland seem to be agreed on only one point, namely, that the Goidels, the people who introduced the Irish language into Ireland, were the first Celtic-speaking people to reach that island. As to the approximate date of their arrival various conjectures have been made, ranging from c. 2000 to c. 350 B.C. In the Fir Bolg, the people who as we infer from Irish tradition, constituted the most important element in the pre-Goidelic population, some scholars, like RHYS and VAN HAMEL, see a race of mythic beings; but most authorities regard them as an historical people who spoke a non-Celtic, or rather non-Indo-European, language, while one scholar has put forward the remarkable theory that they were akin to the Eskimos."

Sarton, George. The earliest representations of the remains of prehistoric pile-dwellings, apropos of CONRAD WITZ's painting of 1444. Query no. 65. *Isis* 26, 449-51, 1 pl., 1937. ISIS

Tallgren, A. M. The method of prehistoric archaeology. *Antiquity* 11, 152-61, 1937. ISIS

"This article was first published in French, in Professor TALLGREN's journal, *Eurasia Septentrionalis Antiqua*, vol. X, 1936.

Wakefield, E. G.; Dellinger, Samuel C. Artefacts found among the remains of the "mound builders". *Bulletin of the institute of the history of medicine* 5, 452-60, 5 pl., 1937. ISIS

Wernert, Paul. Le role du feu dans les rites funéraires des hommes fossiles. *Revue générale des sciences* 48, 211-17, 1937. ISIS

40. — ETHNOLOGY

(Primitive and popular science)

Alford, T. W. Civilization. As told to FLORENCE DRAKE. xiii + 203 p. Norman, University of Oklahoma Press, 1936 ($ 2.50). ISIS

The beautifully rendered story of an American Indian child's progress from aboriginal tribal life into the white man's civilization. The narrator's mission of bringing the white man's civilization to his people, his trials, defeats, and successes constitutes the main theme of an unusual book.
M. F. A.-M.

Arensberg, Conrad M. The Irish countryman. An anthropological study. xi + 216 p. New York, MACMILLAN, 1937 ($ 3.00). ISIS

A charming popularly written account of the modern Irish countryman. M. F. A.-M.

Ashley-Montagu, M. F. Physiological paternity in Australia. *American anthropologist* 39, 175-83, 1937. ISIS

"Ever since the publication in 1899 of SPENCER and GILLEN's *The native tribes of Central Australia*, the work in which it was first declared that there were aboriginal tribes in existence in Australia who possessed no knowledge whatsoever of the relationship between intercourse and pregnancy, there has been a great deal of discussion concerning the nature of this ignorance and not a little controversy. The ground had long been prepared upon which such a discovery could fall with fruitful advantage by the writings of the evolutionists, whose views were given a syncretic summarization in this connexion by HARTLAND in 1894 in the first volume of his *The Legend of Perseus*, in which the suggestion was put forward that 'the world-wide-story-incident of Supernatural Birth' probably originated in a period when the physical relationship between father and child was imperfectly understood, or rather, not understood at all. It remained for SPENCER and GILLEN to provide the proof that tribes exhibiting such a nescience of the facts of procreation actually existed in central Australia." Discussion of the question for which see also *Isis* 13, 395-97. G. S.

Aydiner, Hüsnü. La médecine populaire à Pireler Kondu. *Türk tib tarihi arkivi* (Archives d'histoire de la médecine turque) 2, 30-1, 1937. ISIS

Bergsøe, Paul. The metallurgy and technology of gold and platinum among the pre-Columbian Indians. 45 p. *Ingeniørvidenskabelige Skrifter*, no. A 44, Danmarks Naturvidenskabelige Samfund, København, 1937. ISIS

Boletín bibliográfico de antropología americana. Published by the Instituto Panamericano de Geografía e Historia. Vol. 1, nos. 1 and 2, 77 + 22 p., January to June, 1937. Correspondence concerning the *Boletín* should be addressed to the Editor, Sr. Dr. ALFONSO CASO, Avenida del Observatorio, núm. 192, Tacubaya, D. F., Mexico. ISIS

A new quarterly devoted to the bibliography of what in modern Spanish could be designated as "americanistica", i.e., of American anthropology in its obsolete and all-inclusive sense : anthropology proper, prehistory, history, archaeology, ethnography, linguistics, religions, etc. The introductory papers deal with the organization of the Panamerican Institute, of

the *Boletín*, and of the Library of the Institute, with Maya archaeological research in 1936, and with archaeological work in the Southern California Desert and in Nevada. There are nine reviews of books and of papers, and the first issues of two important bibliographies : *Materiales para una bibliografía etnográfica de la América Latina*, by WIGBERT JIMÉNEZ MORENO (first part : Bibliografía etnográfica de México, p. 47-77), and *Bibliografía Maya*, by RAFAEL HELIODORO VALLE (letters A and B, p. 1-22 of the appendix). A. P.

Curran, C. H. Insect lore of the Aztecs — revealing early acquaintanceship with many of our agricultural pests and therapeutic measures against so currently prominent a creature as the black widow spider. *Natural history* 39, 196-203, 1937. ISIS

Davidson, D. S. (editor). Publications of the Philadelphia Anthropological Society. Vol. 1, Twenty-fifth anniversary studies. vi + 235 p. Philadelphia, University of Philadelphia Press, 1937 ($ 2.50). ISIS

The first of a new series of volumes to be published by the Philadelphia Anthropological Society containing the following contributions : The Stick-fast motif in the tar-baby story, W.N. BROWN. Gods and heroes on Maya monuments, MARY BUTLER. The significance of Folsom and Yuma artifact occurrences in the light of typology and distribution, J. L. COTTER. Foot forms of pottery vessels at Piedras Negras, FRANK N. CRESSON, jr. The relation of Tasmanian and Australian cultures, D. S. DAVIDSON. A preliminary sketch of the Eyak Indians, Copper River Delta, Alaska, FREDERICA DE LAGUNA. Index mollusca and their bearing on certain problems of prehistory : a critique, LOREN C. EISELEY. Cross-cousin marriage in the Lake Winnipeg area, A. IRVING HALLOWELL. The emergence of a general Folsom pattern, EDGAR B. HOWARD. Australian cult totemism, NATHANIEL KNOWLES, jr. Late archaeological sites in Durango, Mexico, J. ALDEN MASON. Friendship as a functional motive in ceramic types of eastern North America, SAMUEL W. PENNYPACKER, 2nd. Composition of 'torts' in Guajiro society, VINCENZO PETRULLO. Identification of Maya temple buildings at Piedras Negras, LINTON SATTERTHWAITE, jr. Catawba medicines and curative practices, FRANK G. SPECK. Fijian dreams and visions, DOROTHY SPENCER. The scope of the rite of adoption in aboriginal North America, H. NEWELL WARDLE. Marriage among the Babudja in Southern Rhodesia, HEINZ A. WIESCHOFF.

The Philadelphia anthropological society is to be felicitated upon the appearance and the quality of its first publication which we hope represents but the first in a long line of successors. M. F. A-M.

Krige, E. J. The social system of the Zulus. xix + 420 p. London, LONGMANS GREEN, 1936 (25 s.). ISIS

A comprehensive and invaluable source-book on the Zulu compiled from the most reliable authorities from the earliest times to the present day. M. F. A-M.

Lévy-Bruhl, Lucien. Primitives and the supernatural. Authorized translation by LILIAN A. CLARE. 405 p. New York, DUTTON, 1935. ISIS

Reviewed by C. A. KOFOID, *Isis* 27, 104-05, 1937.

Lowie, Robert H. Essays in anthropology presented to ALFRED LOUIS KROEBER. Edited by ROBERT H. LOWIE. xxiii + 433 p. University of California Press, 1936. ISIS

Reviewed by M. F. ASHLEY-MONTAGU, *Isis* 27, 102-03, 1937.

Moreno, Wigberto Jiménez. Materiales para una bibliografía etnográfica de la América Latina. Primera parte : Bibliografía etnográfica de México. *Boletín bibliográfico de antropología americana* 1, 47-77, 1937. ISIS

Porteous, S. D. Primitive intelligence and environment. ix + 325 p. New York, MACMILLAN, 1937 ($ 3.00). ISIS

An extremely valuable and provocative account of a psychologist's observations on the mentality of two peoples living under similar environmental conditions, namely, the Australian aborigines and the Bushmen of the Kalahri Desert. M. F. A-M.

Proell, Friedrich Wilhelm. Von den Uranfängen der Zahnbehandlung. *Proteus* 2, 134-38, 1937. ISIS

Smets, Georges. Quelques remarques sur la technique des Barundi. *Archeion* 19, 56-66, 1937. ISIS

Speck, F. G. Naskapi : the savage hunters of the Labrador Peninsula. 248 p. Norman, University of Oklahoma Press, 1935 ($ 3.50). ISIS

A good, rather generalized, account of the ethnology of the Naskapi Indians of Northern Labrador. M. F. A-M.

Valle, Rafael Heliodoro. Bibliografía Maya. First issue : Letters A and B. *Boletín bibliográfico de antropología americana* 1, 1-22, Mexico, 1937. ISIS

This new publication of the Instituto Panamericano de Geografía e Historia forms an appendix to the *Boletín*, and has an independent pagination. It will cover the bibliography of the whole field of Maya studies, from their beginnings. Some of the titles are followed by brief notes; the tables of contents of some of the books are reprinted. A. P.

Viljoen, Stephan. The economics of primitive peoples. 282 p. London, KING, 1936, (12/6). ISIS

The subject of which this work treats is a very important one. To be treated successfully it would require the training and point of view of the anthropologist. The author is an economist and nowhere in his book is there any evidence to be found that the author is possessed of the proper anthropological perspective. His book, none the less makes for interesting reading critically applied. M. F. A-M.

Warner, W. Lloyd. A black civilization. xviii + 594 p. New York, HARPER, 1937 ($ 5.00). ISIS

This book represents the result of three years of field-work among the Murngin tribe of northeastern Arnhem Land, North Australia. It may at once be said that this book is the best social study of an Australian tribe which has thus far made its appearance. This statement does not mean that the present work is the perfect account of an Australian tribe, — such a work has yet to be written, — but it is intended to mean that it is a more comprehensive and a more intelligently written account of an Australian culture than any which we have hitherto had. The passage of the years has served to bring out the appreciable defects of such classical and still invaluable works as those by SPENCER and GILLEN, SPENCER, HOWITT, STREHLOW and BASEDOW. The earlier workers were greatly handicapped by the lack of any definite methodology in their field-work, in the circumstances an inevitable handicap since each of these workers were pioneers in the field of Australian ethnography, — where they worked and what they did no man had ever worked or done before. The last thirty years have seen a great development of interest in Australian cultures, and the brilliant work of RADCLIFFE-BROWN may to a large extent be said to have been responsible both for the development of that interest and the provision of the method for the study of Australian aboriginal cultures. Professor LLOYD WARNER is a pupil of RADCLIFFE-BROWN, hence the method of his study is functional and — intelligible. The book is bound to establish itself as a standard work. M. F. A-M.

41. — SUPERSTITION AND OCCULTISM

Darling, Chas. R. Fire-walking. *Nature* 137, 621, 1936. ISIS

Grossman, Philip. Sleeping along the meridian. Second answer to query no. 46. *Isis* 26, 448-49, 1937. ISIS

Thorington, J. Monroe. Iron votive offerings of St. LEONHARD. *Annals of medical history* 9, 111-13, 1 fig., 1937. ISIS

43. — SOCIOLOGY, JURISPRUDENCE AND POSITIVE POLITY

Culver, Dorothy C. Methodology of social science research : a bibliography. x + 159 p. Berkeley, University of California Press, 1936 ($ 2.00). ISIS

This volume, which is one of the publications of the Bureau of Public Administration of the University of California, presents a selected and annotated bibliography, drawn from sources in the English language published since 1920, dealing with the types of methods and techniques which have been used in research in the social sciences. It should prove very useful to a wide circle of readers. M. F. A-M.

Dollard, John. Caste and class in a southern town. iii + 502 p. New Haven, Yale University Press, 1937 ($ 3.50). ISIS

The blossoms that bloom in the verbal spring of Dr. DOLLARD's book may have the effect of preventing some readers from pursuing it beyond the opening pages. The proper use of the English language is not Dr. DOLLARD's strong point; a word means exactly to Dr. DOLLARD what he wants it to mean (like the case of a famous character in *Alice in Wonderland*), no matter what common usage has caused it to mean to others. This is unfortunate. In the social sciences, particularly those relating to the study of human behaviour, the translation of a datum of experience into a readable fact is an ability — obviously one may have the capacity but not the ability — which social scientists must possess as a minimum essential if their field of knowledge is ever to become a part of the universe of science. Dr. DOLLARD has not yet developed this ability, yet has written a book which is at once interesting, important, and valuable. His object has been to present an analysis, a dynamic view, of social life in a town fairly typical of the deep South. The originality of his work lies in the methods which he has brought to bear upon his material, drawing as he does upon social psychology, sociology, psychology, and even anthropology. As a study in the relation between culture and personality, as a foot note to the larger problem of the relations between Negro and White in the South, and as a contribution to our understanding of the possibilities of a method which Dr. DOLLARD has in this book adumbrated, Dr. DOLLARD's study is greatly to be welcomed. It is likely to act as an healthy stimulus to others to go and do likewise. In an Appendix Dr. LEONARD W. DOOB contributes a valuable account of the frustrated class of Southern 'poor whites.' The book is beautifully produced and published for the Institute of human relations by the Yale University Press. There is a good index. M. F. A-M.

Horney, Karen. The neurotic personality of our time. 299 p. New York, NORTON, 1937 ($ 3.00). ISIS

It is no exaggeration to say that this book will prove to be a landmark

in the history of the development of the theory and practice of psychoanalysis; not only this, it is bound to exert a considerable effect upon the borderland sciences which are in any way concerned with the manifestations of human behaviour. Unquestionably this book must be read by anyone who wishes to obtain a really clear insight into the relation between culture and personality, not alone of individuals living in our own society but in any society whatsoever. In the present volume Dr. HORNEY discusses the problem of the neurotic personality in our own culture, and it is her signal contribution to the subject that she is able to show how dominant a part the cultural factor plays in determining the neurotic personality, as against the presumed dominance of the rather metaphysical biological factor of the Freudian school. Some wit has defined psychoanalysis as "conversation *ad libido*." Dr. HORNEY takes both the conversation and the libido out of psychoanalysis, and puts it upon a rational basis of such a nature that not even the most hardened empiricist or rationalist could find anything in her discussion to which objection could be taken. This is in itself a noteworthy achievement. The book is simply and clearly written, technical terms have been purposely abjured, so that all classes of readers may benefit from a reading of a text unobscured by terms of doubtful meaning. That Dr. HORNEY has been able to write so good a book is not a little due to the recent discovery in anthropology of the individual. This book is only one indication of the good which may come to social scientists if they would pay a little attention to the findings of modern anthropology. M. F. A-M.

Merton, Robert K. Science, population and society. *Scientific monthly* 44, 165-71, 1937. ISIS

"One may say that a high degree of social interaction tends to foment rebellion against traditionalism and to make for the willing acceptance of novelties and innovations. It tends further to enhance scientific development by increasing the probability that scattered observations will be unified by some generalizing theory. Finally, criticism (as one form of social interaction) increases the pressure upon scientists for methodically following through the implications of their theories beyond the point where they may have felt personally content with their research. In this way, the rate of scientific development is materially increased and the resulting theoretic structure maintains a high degree of inner consistency and coherence."

Spiegelberg, Herbert. Gesetz und Sittengesetz. 380 p. Zürich, NIEHAN, 1935. ISIS

Reviewed by CARL JOACHIM FRIEDRICH, *Isis* 27, 105-11, 1937.

44. — HISTORY OF CIVILIZATION

(*General history, historical methods, biography and chronology*)

Arens, Franz. La psychologie en histoire et la "métaethnique". *Revue de synthèse* 13, 15 p., 1937. ISIS

Independence, convergence and borrowing in institutions, thought, and art. x + 272 p. Cambridge, Harvard University Press, 1937 ($ 3.00). ISIS

This volume embodies a group of sixteen brief addresses which were delivered at the symposia of the Harvard tercentenary conference of arts and sciences. The bag is a very mixed one, not in quality, for this is uniformly good, but in the nature of the elements which each lecturer has independently selected as illustrative of his case, — a fact which is extremely fortunate. It would be impossible within the space of a review to discuss the contribution to a clearer understanding of the problems of diffusion, convergence, independent development, and borrowing in the sphere of cultural phenomena which each of these essays makes, but for those who are interested it is perhaps sufficient to say, in a time-honoured cliche, that they cannot afford to miss reading this volume, which is made up of the following contributions : V. GORDON CHILDE, A prehistorian's interpretation of diffusion; E. D. MERRILL, Plants and civilizations; M. I. ROSTOVTZEFF, Parthian art and the motive of the flying gallop; E. NORDEN, Das älteste Gedicht der lateinischen Literatur (Carmen Arvale) ; L. WENGER, Ancient legal history; R. MAUNIER, La diffusion du droit français en Algérie; L. GINZBERG, Jewish folklore : East and West; C. H. DODD, Hellenism and Christianity; F. M. POWICKE, England and Europe in the thirteenth century; H. O. TAYLOR, Placing the Middle Ages; A. GOLDSCHMIDT, Die Bedeutung der Formenspaltung in der Kunstentwicklung; J. BÉDIER, La Poésie française aux jours de la première croisade; E. GILSON, Medieval universalism and its present value; HU SHIH, The Indianization of China : a case study in cultural borrowing; M. ANESAKI, East and West : The meaning of their cultural relations; P. PELLIOT, The royal tombs of An-Yang. M. F. A-M.

Linton, Olof. L'année, le mois et le jour de la création. Contribution à l'histoire de la chronologie chrétienne. *Lychnos* 2, 271-312, Uppsala 1937 (in Swedish with French summary). ISIS

"L'auteur a choisi comme point de départ l'*Ordo Temporum* (1741) du célèbre théologien allemand J. A. BENGEL, œuvre très connue de son temps et qui, écrite à une époque où les progrès des sciences naturelles commencent à exiger une revision des conceptions chrétiennes traditionnelles se rapportant à l'âge du monde, est une des dernières œuvres d'importance dans son genre. BENGEL date le début de la création du dimanche 10 octobre 3943 av. J.C. Quelles sont les traditions et les idées qui servent de base à la fixation d'une telle date ?"

Lovejoy, Arthur O. The great chain of being. ix + 382 p. Harvard University Press, 1936. ISIS

Reviewed by H. T. DAVIS, *Isis* 27, 111-14, 1937.

Sandoz, Edouard. Suggestions for dating and identification by heraldry and armor. *The Colophon* 2, 323-37, 1937. ISIS

An extremely useful introduction to the methods to be followed in dating MSS and other works by heraldry and armor, and in tracing unidentified crests to their origins. M. F. A-M.

Schindler, Margaret Castle. Fictitious biography. *American historical review* 42, 680-90, 1937. ISIS

Including a list of the known fictitious biographies in APPLETON's *Cyclopaedia of American biography* (1887-89). G. S.

46. — HISTORY OF LANGUAGE WRITING AND LITERATURE

Baldensperger, Fernand. "Romantique", ses analogues et ses équivalents. Tableau synoptique de 1650 à 1810. *Harvard studies and notes in philology and literature* 15, 105 p., Cambridge, 1937. ISIS

Craig, Alec. The banned books of England. 207 p. Foreword by E. M. FORSTER. London, ALLEN & UNWIN, 1937 ($ 2.90). ISIS

This book presents a timely analysis of the situation relating to the legal suppression of printed matter in England. There is a chapter also devoted to the position in America. The author's purpose is to make the law bearing on the subject clear to the reader with the object of rendering him capable of working for the reform of laws which are demonstrably stupid and socially reprehensible. The discussion of the lines along which the demand for reform of the existing law should proceed is very ably done. Indeed, the book is commendably levelheaded and restrained, and it is to be hoped that it will be instrumental in bringing the disgrace of police dictatorship in science and literature to a speedy end. In Appendices the author gives a list of important cases, statutory provisions, eminent persons who have appeared as witnesses in such cases, reputable books which have been banned. There is a good bibliography and an index. M. F. A-M.

Gardiner, Alan H. Linguistic theory. *English studies* 19, 58-65, 1937. ISIS

Jackson, Hartley E. 26 lead soldiers. xiv + 214 p. Stanford University Press, 1937 ($ 3.00). ISIS

This book on the methods and processes of printing is intended for all those who have anything to do with the printed word. All the technical details of the printer's art are here exhibited and discussed, and at the foot of each page there are examples of the types most commonly used in magazine or newspaper printing. Most writers are quite inadequately informed anent the problems which begin only when they have completed their manuscript.

An acquaintance with the nature of these problems serves greatly to economise the labours of the writer, editor, and printer, and moreover makes for better and more careful writing. This book is therefore to be heartily recommended to those who more than anyone else continue to make the printer suffer — namely, those who write what the printer will set up and the proofreader be forced to read. M. F. A-M.

Macalister, R. A. Stewart. The secret languages of Ireland : with special reference to the origin and nature of the Shelta language, partly based upon collections and manuscripts of the late Dr. JOHN SAMPSON. x + 284 p. Cambridge, University Press, 1937. ISIS

Reviewed in *Nature* 139, 692, 1937.

Martins, João. De l'histoire de la paléographie en Portugal. III^e^ congrès international d'histoire des sciences, Actes, conférences et communications, 127-36, Lisbon 1936. ISIS

48. — HISTORY OF PHILOSOPHY

(*See also above* 18. *Philosophy of science*)

Bergson, Henri. La pensée et le mouvant. Essais et conférences. 324 p. Paris, ALCAN, 1934. ISIS

"Le présent recueil comprend d'abord deux essais introductifs que nous avons écrit spécialement pour lui (Croissance de la vérité; mouvement rétrograde du vrai. De la position des problèmes. 106 p.). Les autres sont des articles ou des conférences... datant de la période comprise entre 1903 et 1923. Ils portent principalement sur la méthode que nous croyons devoir recommander au philosophe. Remonter à l'origine de cette méthode, définir la direction qu'elle imprime à la recherche, tel est plus particulièrement l'objet des deux essais composant l'introduction."

Huizinga, Jan. In the shadow of to-morrow. A diagnosis of the spiritual distemper of our time. Translated from the Dutch by J. H. HUIZINGA. ix + 228 p. London, HEINEMANN, 1936. ISIS

Reviewed by GEORGE SARTON, *Isis* 26, 487-89, 1937.

Saxl, Fritz. Veritas filia temporis. *Philosophy & history, essays presented to Ernst Cassirer*, 197-222, 13 fig., 1936. ISIS

49. — HISTORY OF RELIGION

(*Science and religion*)

Hennig, Richard. Die Bedeutung des Jungfrau-Sternbildes für die Entstehung Madonnenkults. *Proteus* 2, 48-53, 1937. ISIS

"Der Tag Mariä Himmelfahrt (=Tod) ist erst in christlicher Zeit, nach dem Muster von Christi Himmelfahrt, festgesetzt worden. Als Festtag ist er vom byzantinischen Kaiser MAURITIUS i.J. 582 eingeführt und später von der römischen Kirche übernommen worden. Wie ich nun mit Hilfe des Düsseldorfer Planetariums am 29. September 1936 erstmalig nachweisen konnte, war in Konstantinopel in der 2. Hälfte des 6. Jhs. in der Tat der 15. August der Tag, an dem der Stern Spica zum letzten Mal am frühen Abendhimmel sichtbar war, bevor er für 40 Tage in den Strahlen der Sonne verschwand. Es ist einfach unmöglich, dass diese Übereinstimmung zufällig ist : die Wahl des Tages des Festes für Mariä Himmelfahrt ist zweifellos durch den heliakischen Untergang der Spica bestimmt worden ! Es steht somit fest, dass die Christen des ersten Jahrtausends ganz bewusst den Madonnenkult in Anlehnung an die Vorgänge am Himmelszelt geformt und ausgestaltet haben." Fantastic ! G. S.

Smyth, Nathan A. Through science to God. vii + 213 p. New York, MACMILLAN, 1936. ISIS

Reviewed by M. F. ASHLEY-MONTAGU, *Isis* 27, 114-16, 1937.

VII. MEDICINE

50. — HISTORY, ORGANIZATION, AND PHILOSOPHY OF MEDICINE

Andrianakos, Tryphon. Evolution and progress of obstetrics and gynaecology in modern Greece. xiv + 190 p. Reprinted from the Hellenic Press 11, Thessalonica 1937 (in Greek). ISIS

Elaborate study of the subject by one very well qualified to write it. The author is professor of obstetrics and gynaecology in the University of Athens and director of the corresponding clinics. Elaborate indices. G. S.

Artelt, Walter. Die Geschichte der Zahnheilkunde, ihre gegenwärtige Lage und ihre Aufgaben. *Deutsche Zahn- Mund- und Kieferheilkunde* 4, 72-7, 1937. ISIS

Castiglioni, Arturo. Pagine di storia del pensiero medico Mediterraneo. *Rassegna clinico-scientifica dell'Instituto biochimico italiano* 14, 28 p., 1936. ISIS

Clark, Paul F. ; Clark, Alice Schiedt. Memorable days in medicine. A calendar. December. *Medical life* 44, 65-126, 1937. ISIS

"With this issue — the 197th of the new series of *Medical life* — PAUL F. CLARK and ALICE S. CLARK, of the department of bacteriology of the

University of Wisconsin Medical School, conclude their *Memorable days in medicine*. The publication dates were as follows : the April calendar appeared in April 1936, 123-143; May-June-July calendars in June 1936, 223-266; August-September-October calendars in September 1936, 367-409; November calendar in November 1936, 473-486; December-January-February-March calendars in February 1937, 65-126."

Diepgen, Paul. Volksmedizin und Wissenschaftliche Heilkunde. Ihre geschichtlichen Beziehungen. Vortrag gehalten am 7. 2. 1936 in der *Berliner Gesellschaft für Geschichte der Naturwissenschaft, Medizin und Technik*, 2, 37-53, 1937. ISIS

Dyroff, Adolf. Über das Verhältnis von Medizin und Naturwissenschaft in der Renaissancezeit. *Proteus* 2, 116-22, 1937. ISIS

Epstein, Sigmund. Art, history and the crutch. *Annals of medical history* 9, 304-13, 11 fig., 1937. ISIS

Gossen, Hans. Medizin- und naturwissenschaftshistorische Lesefrüchte. *Die medizinische Welt* nr. 10, 10 p., 1937. ISIS

Hofschlaeger, Reinhard. Zum Aufbau der Heilkunst in der Zeit der Menschwerdung. *Proteus* 2, 123-34, 1937. ISIS

Horder, Lord. Old diseases and new. *Nature* 139, 571-74, 1937. ISIS

From a Friday evening discourse delivered at the Royal Institution on February 26.

Hume, Edgar E. The army medical library of Washington, the largest medical library that has ever existed. *Isis* 26, 423-47, 2 port., 1937. ISIS

Jorge, Ricardo. La médecine et les médecins dans l'expansion mondiale des Portugais. III[e] congrès internationale d'histoire des sciences, Actes, conférences et communications, 55-67, Lisboa, 1936. ISIS

Kellner, Dr. Geschichte der Medizin, Arzt, Pharmazeutische Industrie. *Janus* 41, 29-32, 1937. ISIS

Kisskalt, Karl. Scherz- und Kneipzeitungen als Quellen der Geschichte der Medizin. *Mitt. zur Gesch. d. Med., d. Naturw. u. d. Techn.* 36, 147-49, 1937. ISIS

Korns, Horace Marshall. Notes on the medical history of Vienna. *Annals of medical history* 9, 345-70, 1937. ISIS

Laignel-Lavastine. M.; Molinery, M. Raymond. French medicine. Translated by E. B. KRUMBHAAR. 188 p., 14 ill. (*Clio medica*, 15). New York, HOEBER, 1934. ISIS

Mead, Kate C. H. Lappic medicine. *Isis* 26, 415-22, 1937. ISIS

Apropos of J. QVIGSTAD, *Lappische Heilkunde*, published by the Institute for comparative studies of culture, Oslo, 1932, p. 270 (Cambridge, Mass., Harvard University Press).

Nardi, G. M. Ricerche storiche intorno alle pratiche di medicina magica con particolare riguardo a quelle del popolo toscano. *Rivista di storia delle scienze mediche e naturali* 28, 136-49, 1937. ISIS

Opuscula selecta Neerlandicorum de arte medica. Fasciculus quartus-decimus quem curatores miscellaneorum quae vocantur Nederlandsch tijdschrift voor geneeskunde, collegerunt et ediderunt. Amstelodami sumptibus societatis, 1937. ISIS

The previous volume of this splendid collection was reviewed in *Isis* 25, 600. The present one contains the works of PISO and TEN RHYNE on tropical medicine and BONTEKOE's on tea. See the notes devoted to each of them under XVII (2), C and D. G. S.

Rey, Abel. La médecine dans l'histoire des sciences. III[e] congrès international d'histoire des sciences, Actes, conférences et communications, 273-75, Lisbon, 1936. ISIS

Rieck, Wilhelm. Das Veterinär-Instrumentarium im Wandel der Zeiten und seine Förderung durch die Instrumentenfabrik H. HAUPTNER. Nebst einem Anhang : Das Hauptner-Werk Solingen. Von KONRAD HAUPTNER. Das Geschäftshaus H. HAUPTNER Berlin. Von HANS HAUPTNER 116 p. figs. Sonderdruck aus dem Jubiläums-Katalog der Firma H. HAUPTNER, Berlin 1932. ISIS

Important publication describing the development of veterinary instruments. It includes many illustrations of Greek, Roman, Arabic instruments. Many are derived from the Spanish MS. of JOHAN ALVARES DE SALAMIELLAS (Bibliothèque nationale, Paris) — for which see my *Introduction* (vol. 2, 1091). This book does credit to the great firm of H. HAUPTNER (veterinary instruments, Berlin). G. S.

Royster, Hubert Ashley. Medical morals and manners. x + 333 p. Chapel Hill, University of North Carolina Press, 1937 ($ 2.50). ISIS

A collection of the author's occasional essays, with some account of North Carolina worthies, such as BUDD of Chatham, and EDMUND STRUDWICK, together with reminiscences of the North Carolina Board of medical examiners, and some 'leaves' from the medical note-book of the author's father. M. F. A-M.

Sayili, Aydin M. Turkish medicine. *Isis* 26, 403-14, 1937. ISIS

Apropos of the investigations carried on at the University of Istanbul by Dr. SÜHEIL ÜNVER and his associates. G. S.

Sigerist, Henry E. Historical background of industrial and occupational diseases. *Bulletin of the New York Academy of medicine* 12, 597-609, 1936. ISIS

Stahl, William Harris. Moon madness. *Annals of medical history* 9, 248-63, 1 fig., 1937. ISIS

Thorndike, Lynn. The debate for precedence between medicine and law : further examples from the fourteenth to the seventeenth century. *Romanic review* 27, 185-90, 1936. ISIS

51. — EPIDEMIOLOGY. HISTORY OF SPECIAL DISEASES. PUBLIC HEALTH AND SOCIAL MEDICINE

Brunn, Walther v. Beiträge zur Geschichte der Mangelkrankheiten. *Münchene Medizinischen Wochenschrift* Nr. 6, 6 p., 1937. ISIS

Castiglioni, Arturo. Storia della chirurgia dell'ernia. 28 p. Scritti di chirurgia Erniaria, pubblicati della R. Università di Padova per commemorare il cinquantenario della operazione di BASSINI. Padova (no date, received July 1937). ISIS

Flaxman, Nathan. The history of heart-block. *Bulletin of the Institute of the history of medicine* 5, 115-30, 1937. ISIS

Froehner, Reinhard. Der Tollwurm. *Proteus* 2, 152-62, 1937. ISIS

Frohn, Wilhelm. Lepra und Syphilis. Zum Vergleich der Ur-

sprungsgeschichte beider Seuchen. Aus der Universitäts-Hautklinik Bonn (Leiter : OTTO GRÜTZ). *Proteus* 2, 138-43, 1937. ISIS

Goldstein, Hyman I. The early use of liver in anemias by the French and Italians. With some historical notes on anemia. *Medical life* 44, 173-94, 1937. ISIS

Halbertsma, K. T. A. Uit de ontwikkelingsgeschiedenis van de staaroperatie. *Bijdragen tot de geschiedenis der geneeskunde* 17, 25-35, 1 port., 1937. ISIS

Meyerhof, Max. The history of trachoma treatment in antiquity and during the Arabic Middle Ages. *Bulletin of the ophthalmological society of Egypt* 29, 48 p., 5 pl., 14 p. in Arabic, Cairo, 1936. ISIS

See same note under XI-1.

Montgomery, Douglass W. The strange history of the vesicle in scabies. *Annals of medical history* 9, 219-29, 1937. ISIS

Penfold, John B. The early history of elephantiasis of the scrotum. *Annals of medical history* 9, 125-32, 1937. ISIS

Shryock, Richard H. Library collections in social medicine. *Amer. Lib. Asso.* 351-62, 1936. ISIS

Silva Correia, Fernando da. Portugal dans l'histoire de l'hygiène. III^e^ congrès international d'histoire des sciences, Actes, conférences et communications 354-65, Lisbon, 1936. ISIS

Stenn, Frederick. The pioneer history of milk sickness. *Annals of medical history* 9, 23-9, 2 fig., 1937. ISIS

52. — HISTORY OF HOSPITALS, OF MEDICAL TEACHING AND OF THE MEDICAL PROFESSION. BALNEOLOGY, MEDICAL GEOGRAPHY

Cardoner Planas, Antoine. Fondation et histoire du Collège royal de chirurgie de Barcelone. III^e^ congrès international d'histoire des sciences, Actes, conférences et communications, 227-43, Lisbon 1936. ISIS

Lannois, M. L'armoire aux archives du collège des médecins de Lyon. *Bull. de la soc. franç. d'hist. de la méd.* 31, 83-90, 1 fig., 1937. ISIS

Napjus, J. W. De hoogleeraren in de geneeskunde aan de hoogeschool en het athenaeum te Franeker (1585-1843). VI. JOHANNES ANTONIDES VAN DER LINDEN. *Bijdragen tot de geschiedenis der geneeskunde* 16, 209-19, 1936. ISIS

Van der Hoeven, J. Een en ander over de examens bij de chirurgijnsgilden en over het "vroedkundig examen". *Bijdragen tot de geschiedenis der geneeskunde* 17, 121-26, 1 facs., 1937. ISIS

53. — PHARMACY. PHARMACOLOGY. TOXICOLOGY

Das Deutsche Apotheken-Museum. Ein Geleitwort zu einer Gründung. *Zur Geschichte der Deutschen Apotheke* Nr. 6/7, 17-20, 1937. ISIS

Ferchl, Fritz. Chemisch-Pharmazeutisches Bio- und Bibliographikon. Herausgegeben im Auftrage der Gesellschaft für Geschichte der Pharmazie. 330 p., Mittenwald (Bayern), NEMAYER, 1937. ISIS

The second part of this very useful biographical dictionary will appear at the end of this year 1937. G. S.

Ferrari, Hélène. Recherches sur l'histoire de la pharmacie à Montpellier au XIXe siècle. 118 p. Montpellier, MARI-LAVIT, 1934. ISIS

Guitard, E. H. Histoire de la pharmacie. *Thalès* 2, 177-79, 1935 (Paris 1936). ISIS

Leake, Chauncey D. History of anesthesia. *Isis* 26, 453, 1937. ISIS

Mas y Guindal, Joachim. L'évolution des revues pharmaceutiques espagnoles. *R. d'hist. de la pharmacie*, 403-08, déc. 1934. ISIS

VIII. EDUCATION

(the methods of accumulating, imparting and diffusing knowledge)

55. — ACADEMIES, SOCIETIES, CONGRESSES. NATIONAL AND INTERNATIONAL ORGANIZATION OF SCIENCE

(*Societies and congresses devoted to particular sciences are classified under those sciences. For the internal organization of science* — Isis 1, 195 — *see section* 17)

Abderhalden, Emil. Festgabe aus Anlass der 250. Wiederkehr des Tages der Erhebung der am 1. Januar 1652 gegründeten privaten Akademie zur Sacri Romani Imperii Academia Caesareo-Leopoldina Naturae curiosorum durch LEOPOLD I (7. August 1687). Herausgegeben im Namen der Kaiserlich Leopoldinisch-Carolinisch Deutschen Akademie der Naturforscher. 62 p., 9 pl. Halle (Salle), 1937. ISIS

Includes papers by EMIL ABDERHALDEN, MAX LUDWIG, HELMUT MINKOWSKI, and HANS SPEMANN.

Bortolotti, Ettore. L'Accademia delle scienze di Bologna durante l'epoca napoleonica e la restaurazione pontificia. Discorso letto alla R. Accademia delle scienze dell' Instituto di Bologna nella sessione del 15 Dicembre 1935. 17 p. Bologna, AZZOGUIDI, 1936. ISIS

56. — BIBLIOGRAPHY

(*Methods, libraries*)

Coustet, Ernest. La recon.titution des documents brulés. *La nature* No. 2.294, p. 170, 1917. ISIS

Parmi les documents qui paraissent irrémédiablement détruits, il en est qui peuvent être reconstitués, bien que les textes en soient devenus invisibles et le papier si fragile, si cassant, que le moindre attouchement suffit à le réduire en miettes, ceci grâce à la photographie. Cela tient à la différence qui existe entre la sensibilité chromatique des sels d'argent et celle de notre œil. Celui-ci est surtout impressionné par la région jaune du spectre : il apercevra donc très difficilement un trait bleu sombre sur fond noir, de même qu'un trait jaune sur fond roux. La plaque photographique, au contraire, plus sensible au bleu qu'au jaune, imprimera le trait bleu comme s'il était blanc ou gris-clair et le fera nettement ressortir sur le fond noir; tandis que le trait jaune se détachera en noir sur le fond roux, traduit par un gris plus au moins foncé. La sensibilité sera d'ailleurs modifiée à volonté par l'emploi

d'émulsions orthochromatiques associées à des écrans colorés compensateurs lorsqu'il s'agira d'une écriture faite d'une encre aux couleurs d'aniline ou aux couleurs végétales, au lieu d'être d'une encre aux sels de fer. L. L.

Sée, Pierre. Les moisissures des livres et des estampes. *Comptes rendus de l'Academie des sciences* 164, 230, 1917. ISIS

Les taches des livres piqués proviennent de champignons inférieurs. Certaines de ces moisissures sécrètent un pigment dont la teinte caractérise l'espèce et qui se diffuse dans les fibres du papier. Les germes de ces véritables maladies du papier ne sont pas apportés par une infection tardive, mais ils préexistent dans la pâte et proviennent vraisemblablement des matériaux (paille, fibres d'alfa, etc.) qui ont servi à la préparer. Quand on les trouve sur des ouvrages datant de plusieurs siècles, ces champignons inférieurs sont morts et dessèchés. L. L.

57. — MUSEOLOGY

(Museums and collections)

Matignon, Camille. La chimie et l'archéologie. *Chimie et industrie*, 24, 124-9, 1930. ISIS

BERTHELOT a été un des premiers à fournir de brillants exemples des services que la chimie peut apporter dans les études archéologiques. L'analyse chimique, l'examen microscopique, l'emploi des rayons X permettent de pénétrer dans la structure des alliages, dans celle des tissus, des poteries, etc. et de dégager les procédés techniques employés. La chimie apporte encore un secours en donnant les moyens de conserver intacts les objets exhumés. C'est ainsi que des objets en plomb : médailles, vases à parfum, etc. s'oxydent peu à peu et finissent au bout d'un certain nombre d'années par tomber en poussière. L'A. a reconnu que tous ces objets, restés enfouis pendant des siècles au fond des eaux s'étaient imprégnées de traces de matières salines qui déterminèrent l'attaque progressive du métal. Ce dernier est malade d'une maladie incurable : en ajoutant dans certaines conditions des traces de sel à une lame de plomb, on peut la voir s'attaquer et se désagréger comme les objets anciens examinés. L. L.

58. — CATALOGUES OF SECOND-HAND BOOKS ON THE HISTORY AND PHILOSOPHY OF SCIENCE

Many catalogues of second-hand books are so interesting and so full of valuable information that we shall henceforth register them in this section, together with other lists of a similar nature, such as catalogues of scientific medals and prints. When applying to the publishers of these catalogues for a copy, please mention *Isis*.

Bibliomane, Le. Sciences occultes (astrologie, magie, magnétisme, sorcellerie. no. 3. 32 p., 898 items. Paris, 2 Avenue Trudaine (received June 1937). ISIS

Brill, E. J. Oriental literature of the large library of the late GABRIEL FERRAND. India and neighbouring countries. Catalogue no. 96, 72 p., 838 items. Leiden 1937. ISIS

Cisnéros, A. Catalogue de livres anciens & modernes, rares et curieux. 48 p., 753 items. Bordeaux, 4 rue Dauphine, 1937. ISIS

Durtal. Livres, plaquettes rares, documents pour servir à l'histoire des sciences. Catalogue 17, 49 p., 740 items. Paris, 12 rue Jacob, 1936. ISIS

Durtal. Livres anciens rares ou curieux en divers genres. 2e partie : livres rares ou curieux pour servir à l'histoire des sciences. Catalogue 19, 61 p., 667 items ; 20, 53 p., 634 items. Paris, 12 rue Jacob, 1937. ISIS

Fock, Gustav. Botanische und zoologische Iconographie sowie eine Auswahl seltener, älterer Reisewerke. Antiquariatskatalog no. 702. 33 p. Leipzig C1, 1935. ISIS

Fock, Gustav. Geschichte der Medizin und Naturwissenschaften. Antiquariatskatalog no. 685. 74 p., 1753 items. Leipzig C1 (received March 1937). ISIS

Fock, Gustav. Zoologia specialis, enthält ein Angebot von Zeitschriften, Büchern und Monographien zum Teil aus dem Besitz des G. GRIMPE und des in den Ruhestand getretenen L. PLATE. Antiquariatskatalog no. 711, 184 p., 5737 items. Leipzig C1, Sternwartenstr. 8, 1937. ISIS

Frommann. Medizin besonders Geschichte der Medizin. Antiquariatskatalog 29. 34 p., 635 items. Jena, Am Eichplatz (received May 1937). ISIS

Glaisher of Greenwich. Nautical, heraldic, topographical and other interesting items. No. 142, 28 p., 87 items. London, S.E. 10, 63 & 65 London St., Greenwich, 1937. ISIS

Goldschmidt, E. P. Books and documents on the history of education, schools, colleges and universities. List 24, 32 p., 235 items. London, W. 1, 45, Old Bond St. (received March 1937). ISIS

Goldschmidt, E. P. Old medical books. 34 p., 214 items. London, W. 1, 45 Old Bond St. (received June 1937). ISIS

Goldschmidt, E. P. Twenty manuscripts and a selection of rare old books mostly illustrated with woodcuts. Catalogue 44, 89 p., 178 items. London W. 1, 45 Old Bond St., (received July 1937). ISIS

Grafton. Transport by road, rail and sea. Catalogue no. 189. 48 p., 977 items. London, W. C. 1, 51 Great Russell St. (received May 1937).

Grant, John. Travel, natural history, sport, medicine, science, botany, important medical sets. 57 p., 1435 items. Edinburgh, 31 GEORGE IV. Bridge, 1937. ISIS

Heffer, W. Catalogue of books & journals on zoology, biology and geology. no. 507. 66 p., 1886 items. Cambridge, 3-4 Petty Cury, 1937. ISIS

Hoosier Bookshop. Americana medica, list 50. 165 items. Indianapolis, Indiana, 2242 Park Ave. (received June 1937). ISIS

Hoosier Bookshop. Medicine, Americana medica, autographs, excerpts, poetry by physicians, miscellaneous. List 53, 212 items. Indianapolis, Indiana, 2242 Park Ave. (received July 1937). ISIS

Knowles, John H. Catalogue of important works chiefly zoology & botany. No. 23, 6 p., 168 items. London, S. E., 19, 87 Church-Road, Upper Norwood, 1937. ISIS

Laffitte, Louis. Littérature générale, philosophie, religions, sciences occultes, Franc-Maçonnerie. Science, histoire naturelle, médecine. No. 78. 92 p., 2508 items. Marseille, 156, La Canebière 1937. ISIS

Lipschutz. Catalogue illustré de tous les ouvrages en langue française sur le judaisme. Liste des périodiques juifs du monde entier. Paris, 1937. ISIS

Nourry, Emile. Médecine ancienne. Anatomie-chirurgie, chimie et alchimie, sciences anciennes. 84 p., 944 items. Paris, NOURRY, 1937. ISIS

Nourry, Emile. Voyages anciens et modernes. No. 279 du Bibliophile français. 92 p., 1074 items. Paris 62, rue des écoles, 1937. ISIS

Paine, Alfred W. A catalogue of books. Chiefly voyages to all parts of the world, including many voyages to and from America. No. 13. 40 p., 328 items. New York, 113 E. 55 St. (received March 1937). ISIS

Quaritch, Bernard. A catalogue of books on early medicine and surgery. No. 531. 44 p., 214 items. London, W. 1, 11 Grafton St., New Bond St., 1937. ISIS

Quaritch, Bernard. A catalogue of books and manuscripts to commemorate the ninetieth anniversary of the firm of BERNARD QUARITCH, 1847-1937. No. 532. 176 p., 579 items. London, W. 1, 11 Grafton St., 1937. ISIS

Quaritch, Bernard. A catalogue of books & periodicals on aeronautics, astronomy, chemistry, electricity, engineering, fortification and gunnery, horology, mathematics, meteorology, mining and minerals, navigation, physics, pyrotechnics, surveying, etc. No. 535. 68 p., 483 items. London, W. 1, 11 Grafton St., New Bond St., 1937. ISIS

Quaritch, Bernard. A catalogue of books relating to the history, art, and natural history of Oriental countries, excluding Egypt. no. 533, 144 p., 1544 items. London, W. 1, 11 Grafton St., New Bond St., 1937. ISIS

Schuman. Rare medical books, catalogue no. 1, 64 p., 447 items. Detroit, Mich., 58 West Adams Ave., 1937. ISIS

(Scribners). Science and thought in the 19th century. A collection of first editions. 147 p. Catalogue no. 113. New York, 597 Fifth Ave. (no date). ISIS

Schwarz, Ignaz. Old science. Catalogue 23. 31 p., 245 items. Vienna, I., Tuchlauben 11 (received in 1937). ISIS

Sotheran, Henry. Annotated catalogue of works on exact science. No. 851, 132 p., 1358 items. London, W. 1, 2, 3, 4 & 5 Sackville St., 1937. ISIS

59. — MEMORIA TECHNICA

Critical Bibliography no. 51. *Isis* vol. 28, 155-316.

This note is published at the end of our bibliography solely for the convenience of the scholars who cut out the whole or part of it, attach extracts to catalogue cards and classify them. By adding this note to the others they will be able to find out rapidly whether this particular bibliography has been analyzed or not.

Isis no. 72 (vol. 26, 2, 310 p., 4 pl., 16 fig., 7 p. facs.). Bruges, 1937. ISIS

Isis no. 73 (vol. 27, 1, 205 p., 1 port., 12 fig.). Bruges 1937. ISIS

These two numbers are analyzed in the fifty-first Critical Bibliography. Every previous number has been analyzed in previous bibliographies. G. S.

60. — ERRATA

Si quis Argi oculos habere posset eosque omnes diligentissime ac accuratissime intenderet in singulos versus, multa tamen eum inter corrigendum effugerent.

SARTON'S *Introduction to the History of Science*

Vol. 1, 135, l. 17. Presumably this refers to 2nd 'greatly enlarged edition' (1905) of Founders of geology, since the 1st edition (1897) deals with modern times only. C. W. A.

ISIS

Vol. 8, 378, l. 3. 1924 instead of 1925.

Vol. 21, 544. HALL, G. STANLEY, born in 1844, not 1846.

577. Note OUDEMANS, replace (1831-95) by (1858-).

Vol. 23, 434, l. 3 from bottom. JOHN FRERE, not FRERES. Same correction on p. 442.

Vol. 25, 189, in RUSKA note read *de aluminibus et salibus* and two lines lower, *bacchar er Raisy*.

528. Note RÂZI. The Doctor KÎK (?) is the late Dr. PIERRE GUIGUES of Beirût. (See *Intr.* 1, 610). Correction kindly communicated by Dr. ERNEST WICKERSHEIMER of Strasbourg and Dr. HENRI RENAUD of Rabat.

Vol. 26, 332, l. 14 from bottom. Was naturally sensitive also in observing...

332, l. 1 from bottom... would accordingly be...

A few other misprints are not mentioned in these errata because they are too obvious to cause any error or confusion. I wish to express my thankfulness to the readers who take the trouble to make the above-mentioned corrections in their set of *Isis* and the *Introduction*. I would advise them, after having accomplished that little task, to write their initials near mine at the bottom of this note to indicate that these and previous errata have been taken into account. G. S.

These and the previous errata have been corrected by...

Index of Authors Included in the Fifty-first Bibliography

The Roman figures followed by (1) or (2) refer to the centurial classification (Part I); thus Aldridge, H.R., XIV (2) means that a paper by Aldridge is listed under fourteenth century, second half.

The Arabic figures refer to the historical and to the systematic classification (Parts II and III) which are subdivided in sections numbered consecutively from 1 to 60. For instance, Amschler, W., 3 indicates that a paper by Amschler is listed in section 3 (Babylonia and Assyria); Adams, C.C., 17 indicates that a paper by Adams is listed in section 17 (Organization of science).

August, 1937. FRANCES SIEGEL.

A

Abderhalden, E., 55.
(Actes du congrès intern. de phil. scien.), 18.
Adams, C.C., 17.
Adams, R., 35.
Aešcoly, A. Z., XVI (1) C.
Åkerström, Å., XVII (2) C.
Aldridge, H. R., XIV (2).
Alford, T. W., 40.
Allen, W., jr., XVI (1) E.
Almquist, J. E., XVI (1) E.
(Ambix), 25.
Amschler, W., 3.
Anastasi, A., 37.
Andrianakos, T., 50.
Antoniadi, E. M., 23.
Arber, A., 28.
Arberry, A. J., XII (1).
Arens, F., 44.
Arensberg, C. M., 40.
Armstrong, E. V., XIX (2) B.
Armstrong-Jones, Sir R., XIX (1) E.
Arrhenius, S., 23.
Artelt, W., XVIII (2) D, 50.
Ashby, T., 5.
Ashley-Montagu, M. F., 34, 39, 40.
Audisio, G., 14.
Austin, H. D., XII (1).
Avi-Yonah, M., 12.
Aydiner, H., 40.
Ayres de Sá, XV (1).

B

Bachelard, G., 22.
Bacq, Z., 27.
Baeumker, C., XII (1), XIII (1).

Baldensperger, F., 46.
Baldwin, E., 36.
Barneck, A., 23.
Barnhart, J. H., 28.
Bartlett, W., XIX (2) D.
Bassermann-Jordan, E. v., 23.
Baudoin, M., 39.
Baudoux, C., IX (2).
Bauer, E., 18.
Baumgartner, L., XVIII (2) D.
Baur, L., XIII (2).
Bayet, J., 1.
Bayon, H. P., XVI (2) D.
Beaujard, A., 11.
Beccaria, A., 6.
Beck, M., 18.
Bellamy, H. S., 23.
Bendheim, O. L., XX D.
Benjamin, A. C., 19.
Berger, S., 2.
Bergsøe, P., 40.
Bergson, H., 48.
Berkeley, XVIII (1) E.
Bernard, L., XIX (1) D.
Bessel-Hagen, E., XVIII (2) A.
Bettencourt Ferreira, J., XVIII (2) C.
Beyer, H., 23.
Bernard, H. (S. J.), XVI (2) E.
(Bibliomane, le), 58.
Bickermann, E., I (2).
Bidez, J., V B. C., V (2), 25.
Biggerstaff, Knight, 10.
Bird, V. E., 26.
Bitting, A. W., 26.
Black, F. A., 23.
Blanché, R., XIX (1) E, 37.
Blokh, M. A., XVIII (2) B, XIX (2) B.
Bogayevski, B. L., 26.
Bohr, N., 18.
Boisacq, E., 28.
(Boletín bibliográfico de antropología americana), 40.
Boll, M., 18.
Bonomo, G. C., XVII (2) D.
Bontekoe, C., XVII (2) C.
Bork, F., 23.
Born, M., XX B.
Bortolotti, E., XIX (2) A, 55.
Bouchery, H. F., IV (2).
Boüard, M. de, XIII (2).
Bouligand, G., 18, 20.
Bowditch, N., XIX (1) A.
Bowie, W., XX B.
Boyd, L.G., 2.
Boyd, W. C., 2.
Bragg, Sir W. H., 24.
Branly, E., XIX (2) B.
Brauns, R., 32.
Breunig, E., XIX (2) B.
(Brill, E. J.), 58.
Brim, C. J., 12.
Bring, S. E., XVII (2) E.
Brito, R., XVI (1) D.
Broglie, L. de, 18, 24.
Brohier, R. L., 9.
Brooks, W. K., XIX (2) C.
Brunet, P., XVIII (1) C.
Brunn, W. v., II (2), XVI (2) D, XIX (2) D, 51.
Brunold, C., 24, 25.
Brunschvicg, L., 18, 37.
Bure, A., XVII (1) C.

C

Cabanes, C., XVIII (2) B.
Cam, G. A., XVI (1) C.
Cameron, G. G., 13.
Campbell, G., XVIII (2) C.
Cannizzaro, S., XIX (2) B.
Capart, J., XVII (1) B, 2.
Carbone, D., XIX (2) D.

Cardoner Planas, A., 52.
Carmody, F. J., XIII (2).
Carnap, R., 19.
Carruccio, E., I (1).
Carvalho, J. de, XVIII (1) B.
Carver, W. B., 20.
Casteret, N., 39.
Castiglioni, A., XVI (1) D, 50, 51.
Causse, A., 12.
Cerasoli, E., 24.
Chavanne, G., XIX (2) B.
Charland, T.M., 6.
Charles, H., VII (1).
Charles-Roux, F., XVIII (2) E.
Chenu, M. D., 6.
Chikashige, M., 8.
Chiò, F., XVIII (2) A.
(Cisnéros, A.), 58.
Cittert, P. H. van, 24.
Clark, A. S., 50.
Clark, G. N., XVII (2) B, 16.
Clark, P. F., 50.
Cohen, E., XVIII (1) B.
Cohen, W. A. T., XVIII (1) B.
Colani, M., 8.
Cole, F. J., XVII (2) C.
Conn, H. J., 27.
Contenau, G., 13.
Cook, S. A., 12.
Cordier, G., 8.
Cortesão, J., XV (2).
Costanzo, G., XIX (2) B.
Coustet, E., 56.
Coutant, V. C. B., III (1).
Cowles, T., XIX (2) C.
Cox, J., XX B.
Craig, A., 46.
Crone, G. R., XVIII (2) C.
Cross, D., 3.
Crowfoot, G. M., 2.
Crowther, J. G., 17.
Culver, D. C., 43.
Cumont, F., XIX (2) E, 23.
Curran, C. H., 40.
Curwen, E. C., 26.
Cushing, H., XIX (2) D..

D

Dahl, F., XVII (2) B.
Dains, F. B., XIX (1) B.
Dantchakoff, V., 27, 28.
Darling, C. R., 41.
Daujat, J., XIII (2).
Davidson, D. S., 40.
Davidson, I., X (1).
Davison, C., 32.
Dawson, C., XVIII (2) E.
Dawson, W. R., XIX (1) E, 2
Dedebant, G., 33.
Dehérain, H., XVIII (2) D.
Dehn, M., 4.
De Jong, R. N., XIX (2) D.
Delacroix, H., 37.
Delatte, A., 7.
Delatte, L., 7.
Delaunay, P., XIX (1) D.
Delevsky, J., 16.
Dellinger, S. C., 39.
Democritos, V. B. C.
Demoor, J., XIX (2) C.
Descartes, XVII (1) A.
Destouches, J. L., 18, 22.
(Das Deutsche Apotheken-Museum), 53.
Develsky, J., 18.
Diepgen, P., XIII (2), 50.
Diergart, P., 16, 25.
Dingle, H., 18, 22.
Dittrich, A., 3.
Dixon, A. C., XX A.
Dollard, J., 43.
Dorveaux, P., XVIII (1) D, XVIII (2) D.

Douglass, A. E., 33.
Drabkin, I. E., I (1) B. C.
Drachman, J. M., 16.
Dubrisay, R., XIX (2) B.
Ducassé, P., XIX (1) E.
Duchesne-Guillemin, M., 8.
Dugas, R., 18, 22.
Duhem, J., XV (1).
Dumas, J. B., 25.
Dunnington, G. W., XVIII (2) A, XIX (1) A.
(Durtal), 58.
Dussaud, R., 12.
Dyroff, A., 50.

E

Eberhard, W., 10.
Edelstein, L., I (1) B. C., 4.
Edgar, J. H., 8.
Eells, W. C., 31.
Einarson, B., IV (2) B. C.
Ekholm, G., I (2).
Elgood, C., 13.
Ellsworth, L., XX C.
Engel, H., XVIII (1) C.
Englhardt, G., 6.
Enriques, F., 16.
Epstein, S., 50.
Erasmus, XVI (1) E.
Erlanger, J., 36.
Esaguy, A. d', XVI (1) D.
Esposito, A., XIX (1) B.
Evans, J., 1.

F

Färber, E., 25.
Fages, P., XVIII (2) E.
Farmer, H. G., XI (1), 14.
Faucci, U., XIX (1) D.
Faye, E. de, III (1).
Feckes, K., XIII (2).
ffoulkes, C., 26.
Feis, O., XV (2).
Felin, F., IV (2) B. C.
Fényes, G., XVI (2) D.
Ferchel, F., 25, 53.
Ferran, C., XVIII (1) E.
Ferrari, H., 53.
Fettweis, E., 40.
Figueiredo, F. de, 6.
Findlay, A., XIX (1) B.
Fischer, M., XIX (2) D.
Flaxman, N., 51.
Flexner, S., XIX (2) D.
Flower, R., XVI (2) E.
(Fock, G.), 58.
Fontoura da Costa, A., XV (2), 31.
Forbes, R. J., 1, 32.
Fränkel, W. K., XV (2), XVIII (2) C, XIX (1) D, XIX (2) B.
Frank, P., 18.
Freind, J., XVIII (1) D.
Friedenwald, H., XVI (1) D, XIX (2) D.
Friedman, R., XVII (2) C, XVII (2) D.
Friend, J. N., XVIII (1) B.
Froehner, R., XIII (1), 51.
Frohn, W., 51.
(Frommann), 58.
Fulton, A. S., 14.
Furlani, G., XII (2).

G

Gabrieli, G., XVII (1) B, XVII (1) C, XVII (1) E.
Gardiner, A. H., 46.
Gardner, G. B., 8.
Garrison, F. H., XX D.
Gaspardone, E., 8.
Gasperini, C. G., XVI (1) D.

Gasser, H. S., 36.
Gause, G. F., 27.
Gautier-Vignal, L., XVI (1) E.
Genouillac, H. de, 3.
Geyer, B., XII (1), XIII (2).
Ghirshman, R., 13.
Giacomelli, R., XV (2) L.
Gilson, E., XIII (2).
(Glaisher of Greenwich), 58.
Godlewski, H., XIX (1) D.
Goitein, S. D. F., IX (2).
(Goldschmidt, E. P.), 58.
Goldsmith, M., XVIII (2) D.
Goldstein, H. I., 51.
Goossens, R., 2.
Gossen, H., 50.
Gouhier, P., XIX (1) E.
Grabau, A. W., 10.
Grabmann, M., XIII (2).
(Grafton), 58.
Granet, M., 10.
(Grant, J.), 58.
Grape, A., XVIII (1) C.
Griffith, F. L., 2.
Grossman, P., 41.
Grosu, A., XIX (2) C.
Gudger, E. W., 29.
Günther, U., 28.
Guitard, E. H., 53.
Gundel, W., 6, 23.
Gurwitsch, A., 37.

H

Haberling, W., 16.
Hadamard, J., XX A.
Hägg, G., 25.
Halbertsma, K. T. A., 51.
Hall, C. R., XIX (1) D.
Halley, C. R. L., XIX (2) D.
Hanke, L., XVI (1) E.
Harden, D. B., 4, 5.
Hardy, G. H., XX A.
Hardy, Sir W. B., XX C.
Hartley, Sir P. H. S., XIV (2).
Hauberg, P., XIII (1).
Hawkes, C. F. C., 38.
(Heffer, W.), 58.
Heidingsfelder, G., XVI (1) E.
Hennig, R., 24, 49.
Henning, W., III (2).
Henriot, E., XIX (1) E.
Heuten, G., III (2).
Heym, G., XVIII (1) B, 25.
Hildebrand, B., XVIII (2) E, XIX (1) E.
Hilgenberg, L., 9.
Hill, T. W., XX E.
Hiscock, W. G., XVII (2) A.
Hodgson, H. B., 31.
Hofschlaeger, R., 50.
Hofsten, N. von, 36.
Hogrebe, J., 23.
Holmes, E., 36.
Holmes, M., XVIII (2) C.
Hönncher, E., XIX (1) D.
Honigmann, E., 4, 14.
(Hoosier Bookshop), 58.
Hooykaas, R., 25.
Horder, Lord, 50.
Hornberger, T., 16.
Horney, K., 43.
Houllevigue, L., XVIII (2) B.
Houston, W. V., 18.
Huber, M., 21.
Hubble, E., 23.
Huebotter, F., 9.
Hufnagel, A., XIV (1).
Huizinga, J., 48.
Hulme, E. W., I (2), 2.
Hult, O. T., XVII (2) C.
Humberd, C. D., XVI (2) B.
Hume, E. E., 50.
Humphreys, A. W., XIX (1) B.

Hunger, F. W. T., XVIII (1) C, 28.
Huxley, J. S., 27.
Hyde, W. W., 5.

I

Iba, Y., 11.
(Independence, convergence, & borrowing in institutions, etc.), 44.
Ionescu, I., XVIII (2) A, X¹X (1) B.
Izquierdo, J. J., XVII (1) D, 36.

J

Jackson, H. E., 46.
Jaguaribe de Mattos, F., 31.
Jameson, E. M., XVIII (2) D.
Jaumotte, J., X¹X (2) B.
Jeffery, A., VII (1).
Jelitai, J., 20.
Jenks, A. E., 35.
Johannsen, O., XVI (1) B.
Johnson, R. P., VIII (2).
Jones, I. B., XIV (1).
Jones, L. W., I (2) B. C.
Jorge, R., 50.
Junk, W., 28.

K

Källquist, E., XVII (1) E.
Kahle, P., XX E.
Karpinski, L. C., 20.
Kelényi, B. O., 23.
Kellner, Dr., 50.
Kelly, E. C., XIX (2) D.
Kendrick, T. D., 38.
Kennelly, A. E., XIX (2) B.
Kerp, H., 31.
Keyser, C. J., IV (2) B. C., 19.
Khemiri, T., XIV (2).
Kisskalt, K., 50.
Klein, M., 27.
(Knowles, J. H.), 58.
Korns, H. M., 50.
Kostitzin, V. A., 33.
Kratchkovskii, I. J., 14.
Krause, M., I (2), X (2).
Krige, E. J., 40.
Kruhm, A., 24.
Kühle, H., XIII (2).
Kurdian, H., XIV (1).

L

Laboulle, M.J.J., XVIII (2) E.
Lacombe, G., XIII (1).
(Laffitte, L.), 58.
Lagrange, J.L., XVIII (2) A.
Laignel-Lavastine, M., 50.
Lamm, M., XVIII (1) E.
Lámpros, S. P., 7.
Langer, R. E., XVII (2) A.
Langerhans, P., XIX (2) C.
Lannois, M., 52.
Larkey, S. V., XVI (1) E.
Leake, C. D., 53.
Lebesgue, H., X X (1) A.
Ledoux-Lebard, R., XVIII (1) D.
Lefebre des Noettes, Ct., 26.
Le Maire, O., 23.
Leoncini, F., XIX (1) C.
Leprince-Ringuet, L., XX B.
Lequier, J., XIX (2) E.
Leroy, M., III (1) B. C.
Levy, H., XVIII (2) E, 18.
Lévy-Bruhl, L., 40.
L'héritier, P., 27.
Liesegang, F. P., XVII (2) B, X¹X (2) B.
Lillie, R. S., 27.
Lindberg, S., XVI (2) E.

Lindenbein, W., XIX (1) C.
Lint, J. G. De, XX D.
Linton, O., 44.
Lippmann, E. O. von, XVII (2) A, XIX (1) C, 3, 25.
(Lipschutz), 58.
Lithberg, N., 23.
Littmann, E., XX E.
Lockart, L., 32.
Lönnberg, E., XVIII (2) C.
Loria, G., XVIII (1) A.
Lot-Borodine, M., XIV (2).
Lottin, O., XVII (2).
Lovejoy, A. O., 44.
Lowie, R. H., 40.
Lucas, H. S., XIV (1), 6.
Ludendorff, H., 23.
Lüdtke, H., XVII (1) B.
Lusk, G., 36.
Lynam, E., XVI (2) C.
Lynch, A., 22.

M

Macalister, R. A. S., 46.
Macdonald, D. B., XI (2), 12.
Macdonald, G., 5.
MacDonald, H. M., XX B.
Machin, A., 27.
Mackay, E., 9.
Macpherson, H., 23.
Magath, T. B., XIX (1) D.
Maimonides, XII (2).
Malisoff, W. M., 18.
Malmeström, E., XX E.
Mandonnet, P., XIII (2).
Mariadasson, P., 9.
Marian, V., XVIII (1) A, XVIII (2) A, XIX (1) A.
Marsden, W. A., XVI (1) D.
Martin, A., 26.
Martins, J., 46.
Marvin, F.S., XIX (1) E.
Mas y Guindal, J., 53.
Massé, H., 14.
Matignon, C., 57.
Matisse, G., 18.
Mayer, L. A., 14.
McColley, G., XVI (2) B, XVII (1) E, XVII (2) B, 6, 23.
McFarland, J., XIX (2) D.
McGuigan, H. A., 24.
McKie, D., 25.
Mead, K. C. H., 50.
Mees, C. E. K., 24.
Meissner, W. W., 25.
Meldau, R., 26.
Mercier, M., 32.
Merton, R. K., 43.
Metchnikoff, E., XIX (2) D.
Metzger, H., XVII (1) B, XVII (2) B, 25.
Meyer, A., XVII (1) B, XVIII (2) C, 27.
Meyer, K., XVIII (1) B.
Meyerhof, M., XI (1), 14, 51.
Mézan, S., 12.
Michel, H., 23.
Milkucki, T., 32.
Miller, H. W., 6.
Miller, W. S., XIX (1) D.
Milne, E. A., 18.
Mineur, H , 23.
Mingana, A., 14.
Mitterer, A., XIII (2).
Molinery, M. R., 50.
Mond, Sir R., 25.
Mondolfo, R., 4.
Monteiro, A. C., XVII (1) E.
Montgomery, D. W., 51.
Moreno, W. J., 40.
Moorad, P. J., 8.
Morant, H. de, 2.
Morgan, J., XVIII (2) D.

Morosan, N., XX C.
Moulton, F. R., 18.
Müller, R., 23.
Mullett, C. F., XVI (1) D, XVII (1) D.
Myers, C. S., 37.
Myller, A., 20.

N

N., F. J., XIX (1) C.
Napjus, J. W., XVII (1) D, XVII (2) D, 52.
Nardi, G. M., 50.
Needham, J., 34.
Neugebauer, O., 1, 3, 20.
Neugebauer, P. V., 23.
Neurath, O., 18, 19.
Nicolle, C., 27.
Nicolson, M., XVII (1) B, XVII (2) E, 23, 24.
Nilsson, M. P., V B. C.
Nordström, J., XVII (1) E.
Norman, D., 23.
Nowacki, W., 32.
Noüy, P. Lecomte du, 27.
(Nourry, E.), 58.
Nuyens, B. W. T., XIX (1) D.

O

Obermiller, E. A., 8.
Ocagne, M. d., XVIII (1) C.
Ockenden, L. C., XIX (1) B.
Odqvist, F. K. G., 26.
Ogura, K., 20.
Ohm, T., XIII (2).
Olmsted, J. M. D., XIX (2) D.
Ono, A., 11.
Oppenheim, D., XVIII (1) E.
(Opuscula selecta Neerlandicorum), 50.
O'Rahilly, T. F., 39.
Orrok, G. A., XIX (2) B.
Oseen, C. W., XVIII (1) E, XIX (1) E.
(Osiris), 16.
Oudemans, A. C., XIX (1) C, 29.

P

Pacotte, J., 18, 19.
(Paine, A. W.), 58.
Paladini, P., XIX (1) D.
Pallary, P., XVIII (2) D.
Paoli, U. G., XVI (1) C.
Papanastassiou, C. E., 24.
Partington, J. R., XIII (2), 25.
Peake, C. H., 10.
Peattie, D. C., 27.
Pelseneer, J., XVI (2) A, XIX (2) B.
Penfold, J. B., 51.
Penglaou, C., 21.
Penning, C. P. J., XVIII (1) C.
Pereira Salgado, J., 25.
Peri, N., 11.
Perna, A., 16.
Perrier, Général, 30.
Pfeiffer, R. H., 3, 12.
Pfister, R., II (2), 9.
Piankoff, A., 2.
Pincus, G., 29.
Pippon, T., VII (1).
Pique, R., 1, 25.
Piso, W., XVII (2) D.
Pitfield, R. L., XIX (2) D.
Places, E. des, IV (1) B. C.
Platt, E. T., 31.
Pogo, A., XVII (1) B.
Polet, A., XVI (1) E.
Ponzi, E., XI (1).
Popa, I., XX A.
Porteous, S. D., 40.

Porto, C., 27.
Post, G., XIV (1).
(Prague, 1937), 16.
Préchac, F., XVI (1) E.
Prévité-Orton, C. W., XIV (1).
Proell, F. W., 40.
(Proteus), 16.
Puech, H.—C., VIII (2).

Q

(Quaritch, B.), 58.
Quercy, P., 37.

R

Rackl, M., XIII (2).
Rainov, T.I., XVIII (1) B, XX B, 16.
Raisz, E., 31.
Ramos da Costa, A., 31.
Randall, A., XIX (1) D.
Ransom, J. E., XVIII (2) D.
Ransome, H. M., 29.
Ray, P. C., 9.
Redstone, L. J., XIV (2).
Redstone, V. B., XIV (2).
Reichborn-Kjennerud, I., 6.
Rempis, C. H., XI (1).
Renaud, P., 25.
Renstock-Huessy, E., 16.
Rey, A., 16, 18, 50.
Reymond, A., 1, 16.
Reynolds, R. L., XIII (1).
Rhyne, W. ten, XVII (2) D.
Richeson, A. W., XVII (2) A.
Rieck, W., 50.
Rijnberk, M. van, XVII (2) C.
Ritchey, G. W., 23.
Roberts, M., XVII (2) B.
Rock, J. F., 10.
Rohr, M. von, 24.
Roland, P., XVII (1) A.
Romanoff, P., 12.
Rosen, G., XIX (2) D.
Roule, L., XVIII (2) C.
Rosenfeld, L., 24.
Royster, H. A., 50.
Rucker, P. P., XIII (2).
Ruede, H., XIX (2) C
Rufus, W. C., 11.
Rusconi, C., 27.
Ruska, J., 25.
Russell, F. S., 27.

S

Sabine, E. L., 6.
Sa'di, L. M., XIX (2) D.
Sainéan, L., XX E.
Salman, D., XIII (2).
Salomon, R., XIV (1).
Sandblad, H., XVI (2) B.
Sandoz, E., 44.
Sandra, H., XVIII (2) D.
Šangin, M. A. F., 23.
Santillana, G. de, 4, 16.
Sarton, G., XVII (2) E, XIX (2) B. X X (2) C, 9, 16, 20, 23, 39.
Sartre, J. P., 37.
Saxl, F., 48.
Saxton, C., XVI (2) C.
Sayili, A. M., 50.
Sbath, P., IX (1).
Scalinci, N., XII (1), XIV (1).
Schacht, J., XI (1).
Schaefer, R. J., XIX (2) D.
Scheil, V., 3.
Schellhas, P., 23.
Schierbeek, A., XVII (2) C, 27.
Schiff, L. J., XIX (2) D.
Schiffer, S., 3.
Schimank, H., XVIII (1) B.
Schindler, M. C., 44.

Schlichting, T. H., V B. C.
Schlick, M., 18.
Schmid, G., XVIII (2) C.
Schmitt, E., 10.
Schmitt, F. S., XI (2).
Schneider, W., XIII (2).
Schofield, B., XVII (2) A.
Schreber, K. E., 24.
Schrecker, P., XVII (2) A.
Schreiber, H., VIII (1).
Schulz, H. C., XV (1).
(Schuman), 58.
(Schwarz, I.), 58.
(Science Museum), 15.
(Scribners), 58.
Scultetus, J., XVII (1) D.
Sée, P., 56.
Seguin, M. A., 8.
Senn, G., IV (2) B. C.
Sergescu, P., 20.
Sernander, R., XVIII (1) C.
Serrus, C., 18.
Sesmat, A., 22.
Seurat, L. G., XIX (2) C, XX C.
Shapiro, I. A., XVII (1) A, XVII (1) B.
Shryock, R. H., 51.
Siciliano, I., XV (2).
Sigerist, H. E., 50.
Sikes, E.E., I (1) B. C.
Silin, C. I., XIX (1) D.
Silva Correia, F. da, 51.
Silvette, H., XVII (2) D.
Simon, M., IV (2).
Simons, L. G., 20.
Slavenas, P., 23.
Smets, G., 40.
Smyth, N. A., 49.
(Sotheran, H.), 58.
Souèges, R., 28.
Speck, F. G., 40.
Speiser, E. A., 3.
Speter, M., XVIII (2) B, XVIII (2) C, XIX (1) B, XIX (1) C, XIX (2) B, XIX (2) C, XX B, 25.
Spiegelberg, H., 43.
Squires, J. D., XIX (2) B.
Stahl, W. H., 50.
Stamp, Sir J., 31.
Stegmann, K., 24.
Stegmüller, F., XVI (2) E.
Steiner, A., XIII (1).
Stejneger, L., XVIII (1) C.
Stemm, F., 51.
Stern, A., XX E, 18.
Sticker, B., 23.
St. Martin, A., XIX (1) D.
Stoner, E. C., 24.
Stuyvaert, M., XX A.
Sudhoff, K., XIII (2).
Süssenguth, A., 25.
Sundquist, N., XVII (2) C.
Suyûṭî, J. ad-D., XV (2).
Svenonius, B., 23.
Sviatlovsky, E. E., 31.

T

Tallgren, A. M., 39.
Tanfani, G., XV (1).
Taniyama, K., 11.
Tannery, P., III (2) B. C., 23.
Taylor, F. S., 4.
Teck, J., XV (2) L.
Temkin, O., XVII (1) D.
Têng, S-y, 10.
Terrey, H., XIX (1) B.
Thieme, P., IV (1) B. C.
Thierens, A. E., 3.
Thomas, E. R., XVII (2) B.
Thompson, D'A. W., 4.
Thompson, J. E., 23.
Thompson, R. C., 3.

Thomson, Sir J. J., XIX (2) B.
Thomson, S. H., 6.
Thomson, W., 14.
Thorington, J. M., 41.
Thorndike, L., XIII (2), XIV (2), XVI (1) B, 6. 50.
Thureau, M., XVI (2) A.
Thureau-Dangin, F., 3.
Titley, A.F., 6.
Torrey, H. B., IV (2) B. C.
Toyoda, T., 11.
Tricot-Royer, Dr., XVI (1) C.
Tropfke, J., 20.
Tyson, E., XVII (2) C.

U

Uggla, A. H., XVIII (1) C, XIX (2) C.
Ullmo, J., XX B.
Ulrich, F., XIX (2) C.
Ünver, A. S., XI (1), XIV (2), 8.
Ussani, V., I (2).

V

Valle, R. H., 40.
Van Damme, D., XVI (1) E.
Van den Dungen, F. H., 22.
Van der Hoeven, J., 52.
Van der Tak, W. G., XVII (2) E.
Van de Vyver, A., 6.
Van de Woesijtne, P., V (1).
Vannier, L., XVII (1) D.
Vansteenberghe, E., XV (1).
Vaux, R. de, XII (2), XIII (1).
Vaz Diaz, A. M., XVII (2) E.
Ver Eecke, P., 4.
Vernadski, V. I., 32.
Vetter, Q., 16.
Viets, H. R., XVII (2) D.
Viljoen, S., 40.
Vinchon, J., XVIII (2) D.
Vogel, K., 3.
Vouillemin, G., 19.

W

Wainwright, G. A., 2, 8.
Waite, F. C., XVIII (1) D.
Wakefield, E. G., 39.
Walde, O., XVI (1) B.
Walden, P., 22.
Wallon, H., 37.
Walsh, E. H. C., 9.
Walsh, J., II (2).
Wang, K-c., 10.
Warner, W. L., 40.
Weck, W., 8.
Weeks, M. E., XIX (1) B.
Wehrlé, P., 33.
Weihe, C., 26.
Weisweiller, H. (S. J.), XII (1).
Welch, W. H., XIX (2) D.
Wernert, P., 39.
Wijk, W. E. van, 23.
White, M.D., XIX (2) C.
Whitehill, W. M., XI (2).
Wilbour, C. E., 2.
Wilhelm, G., 4.
Wilpert, P., XIII (2).
Wilson, P. W., 23.
Wimsatt, W. K., jr., XIII (2).
Winderlich, R., 14, 25.
Witt, R. E., II (2).
Wolff, G., XV (1).
Wolfson, H. A., XVII (2) E.
Wood, C. A., X (2).
Wood, R. W., 2.

Y

Yaltkaya, M., XVI (1) D

Yamamoto, A. S., 23.
Yamamoto, I., XIX (1) B.
Yates, R. C., XIX (2) A.
Yeldham, F. A., 20.
Yonge, C. M., 27.

Z

Zehnder, L., 24.
Zimmermann, E. L., XV (2).
Zinner, E., XIII (2).
Zirkle, C., 28.
Zolli, I., 12.